Povzročitelji, patogeneza, klinična slika in posledice pljučnic goveda

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- Dodiplomski študij, Veterinarska fakulteta, Univerza v Ljubljani 2012-2018
- Doktorat znanosti, Veterinarska fakulteta, Univerza v Ljubljani 2018-2023
- Specializacija, School of Biodiversity, One Health and Veterinary medicine, Univerza v Glasgowu 2022-2026

Povzročitelji

- **Virusi**
  - **BRSV**
  - **BHV-1**
  - **BVDV**
  - **PI-3**
  - **Adenovirus**
  - **Coronavirus**
- **Bakterije**
  - *Mannheimia haemolytica*
  - *Pasteurella multocida*
  - *Histophilus somni*
  - ***Mycoplasma bovis***
  - *Bibersteinia trehalosi*
  - *Trueperella pyogenes*
- **Paraziti**
  - Dictyocaulus viviparous

Primarni povzročitelji

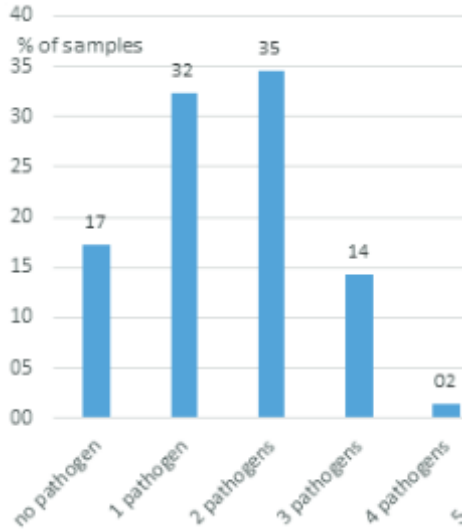
Sekundarni povzročitelji

Pardon, 2020

Povzročitelji v Sloveniji

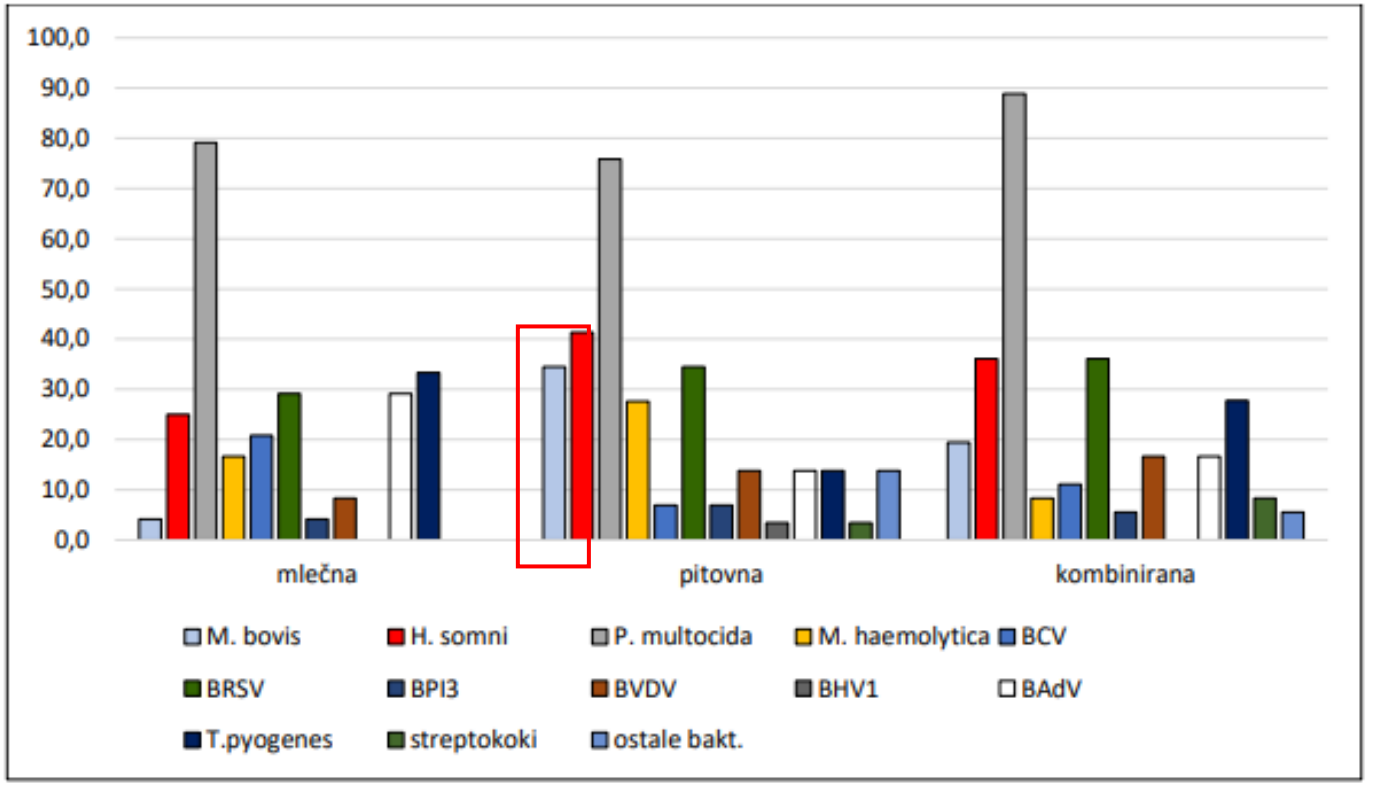
- PCR **nosnih brisov** pri 133 akutno bolnih živalih iz 24 čred (2012-2014)
  - Virusi:
    - BRSV 41%
    - Coronavirus 12%
    - PI-3 3%,
    - BVDV1.50%
    - BHV-1 in adenovirus 0.75%
  - Bakterije:
    - Pasteurella multocida 59%
    - Mannheimia haemolytica 15%
    - Mycoplasma bovis in Histophilus somni 10%

Čreda	Število vzorčenih živali	% pozitivnih
Pitališče	29	100%
Kombinirana reja	61	87%
Molzna reja	20	59%



Paller in sod. (2017)

Povzročitelji v Sloveniji

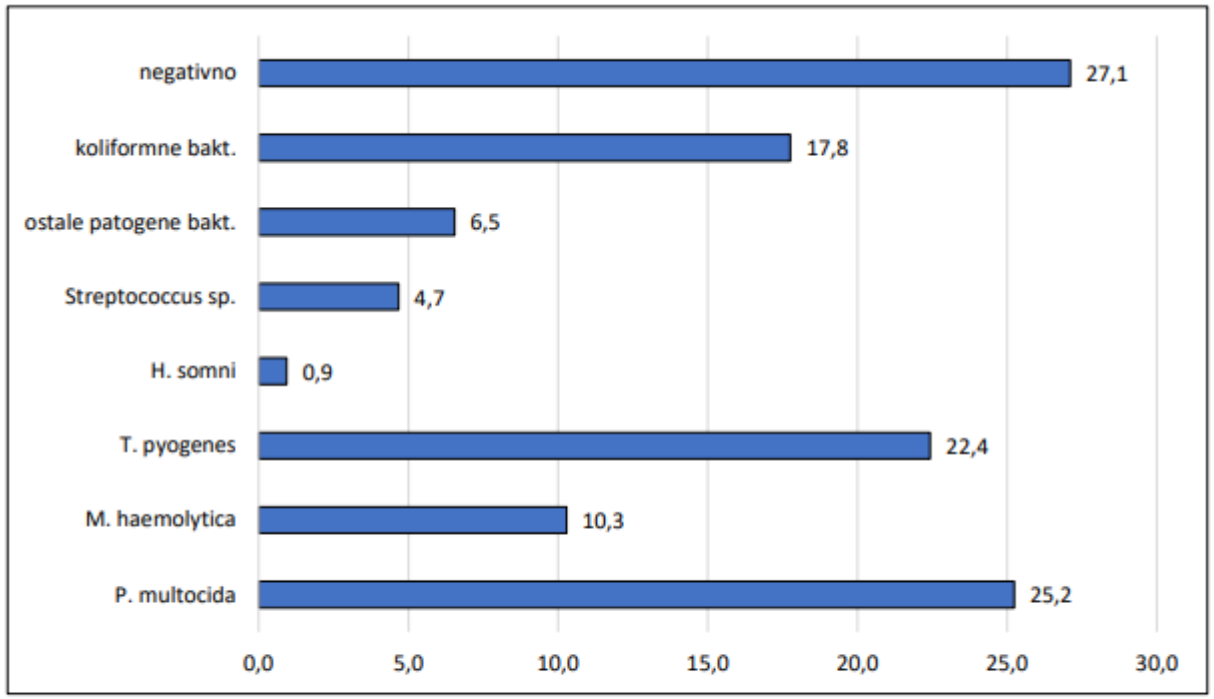


Slika 44: Pojavnost posameznega respiratornega patogena v vzorcih pljuč govedi iz skupine P (N = 89) glede na tip reje (v %)

Figure 44: Prevalence of individual respiratory pathogens in lung samples of cattle from the P-group (N=89) according to the type of breeding (in %)

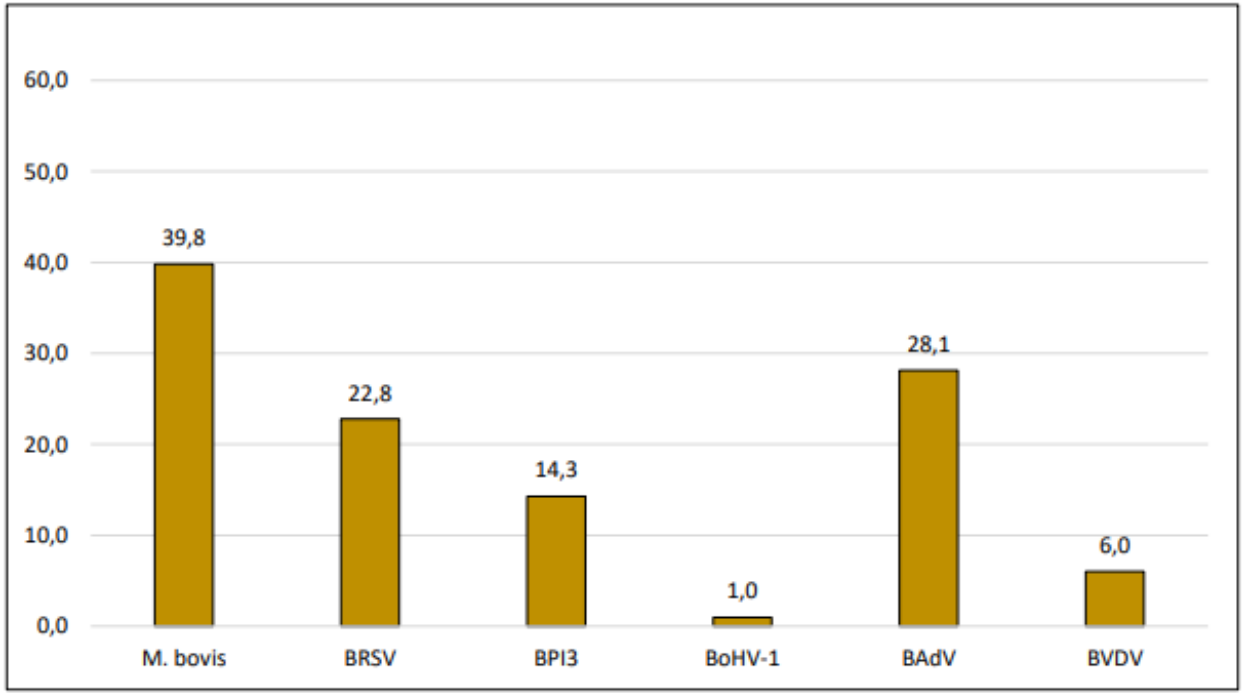
Paller 2019

Povzročitelji v Sloveniji



Slika 21: Delež bakterijskih izolatov posameznih vrst bakterij, ugotovljenih z gojiščno bakteriološko preiskavo v vzorcih pljuč 107 govedi iz skupine P (v %)

Figure 21: The percentage of bacterial isolates of individual bacterial species found with cultural bacteriological examination of lung samples of 107 cattle from the P-group



Slika 20: Delež pozitivnih rezultatov IHC preiskav na prisotnost posameznega respiratornega patogena v vzorcih pljuč govedi iz skupine P (v %)

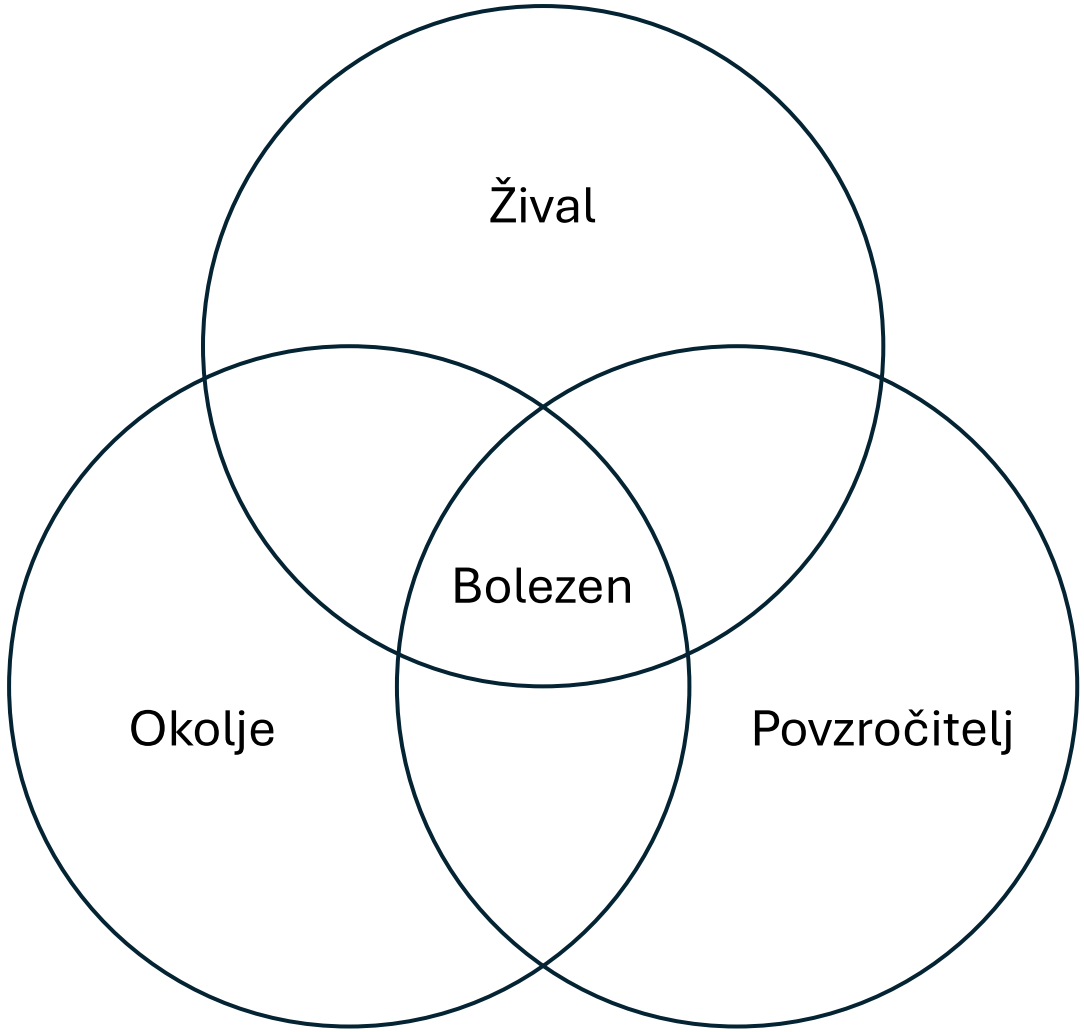
Figure 20: The percentage of results from IHC examination, positive to the presence of individual respiratory pathogens in the lung samples from the P-group

Paller 2019

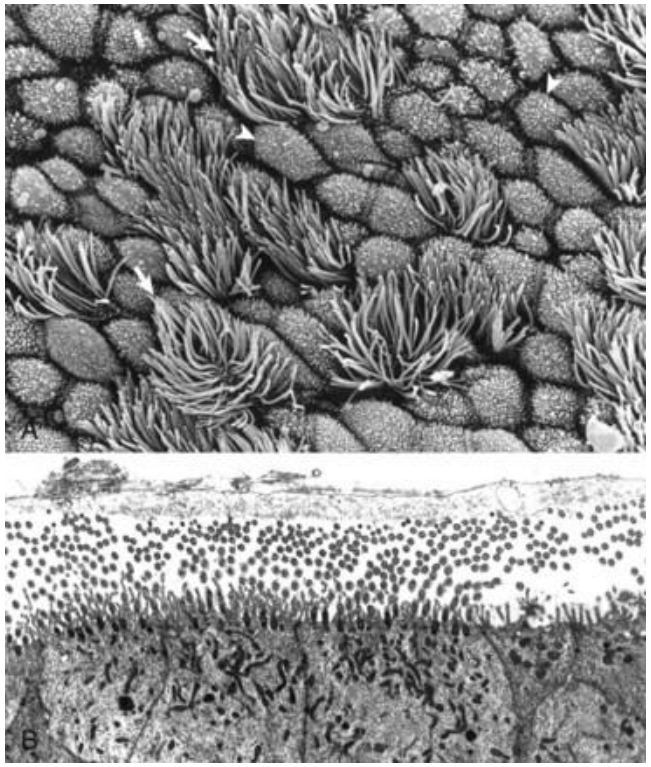
Odraslo govedo

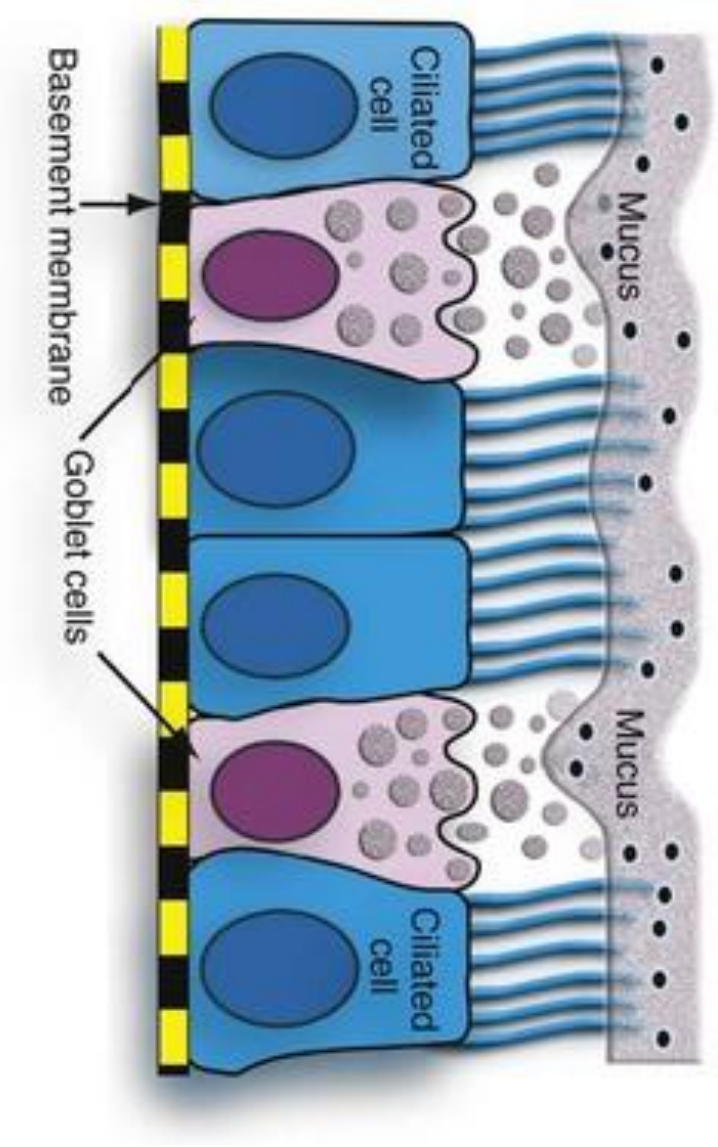
- Infekcijske pljučnice
- Aspiracijska pljučnica
- Parazitarna pljučnica
- Atipična intersticijska pljučnica (3-metilindol “Fog fever“)
- Embolična pljučnica

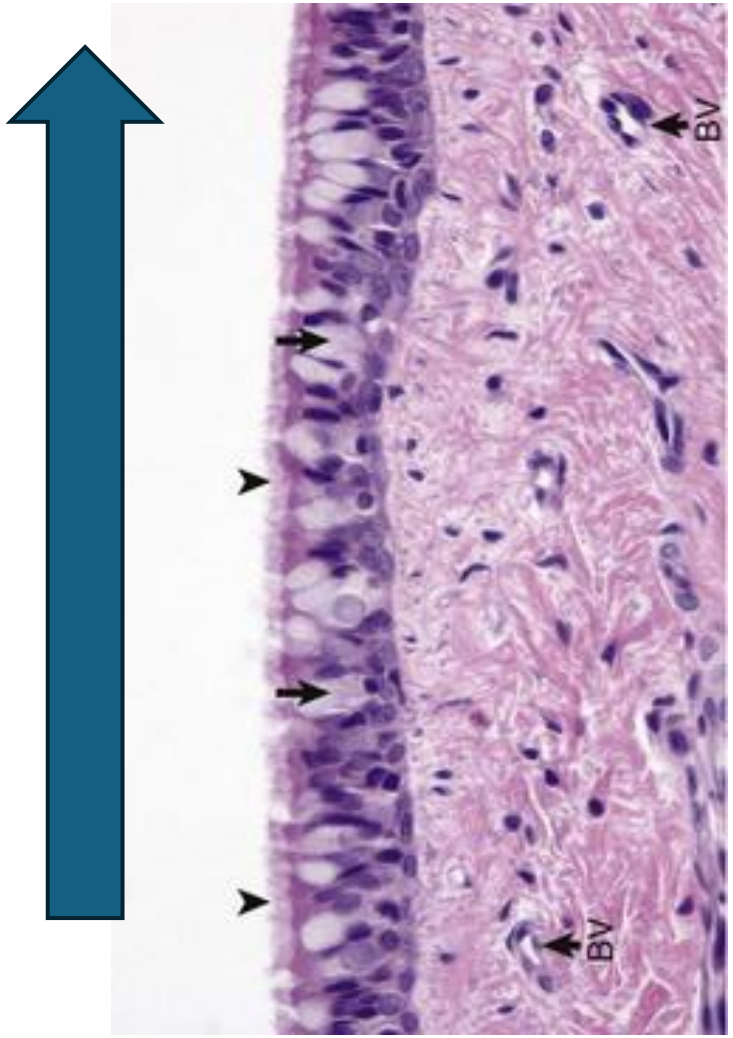
Patogeneza



Zasčita pljuč

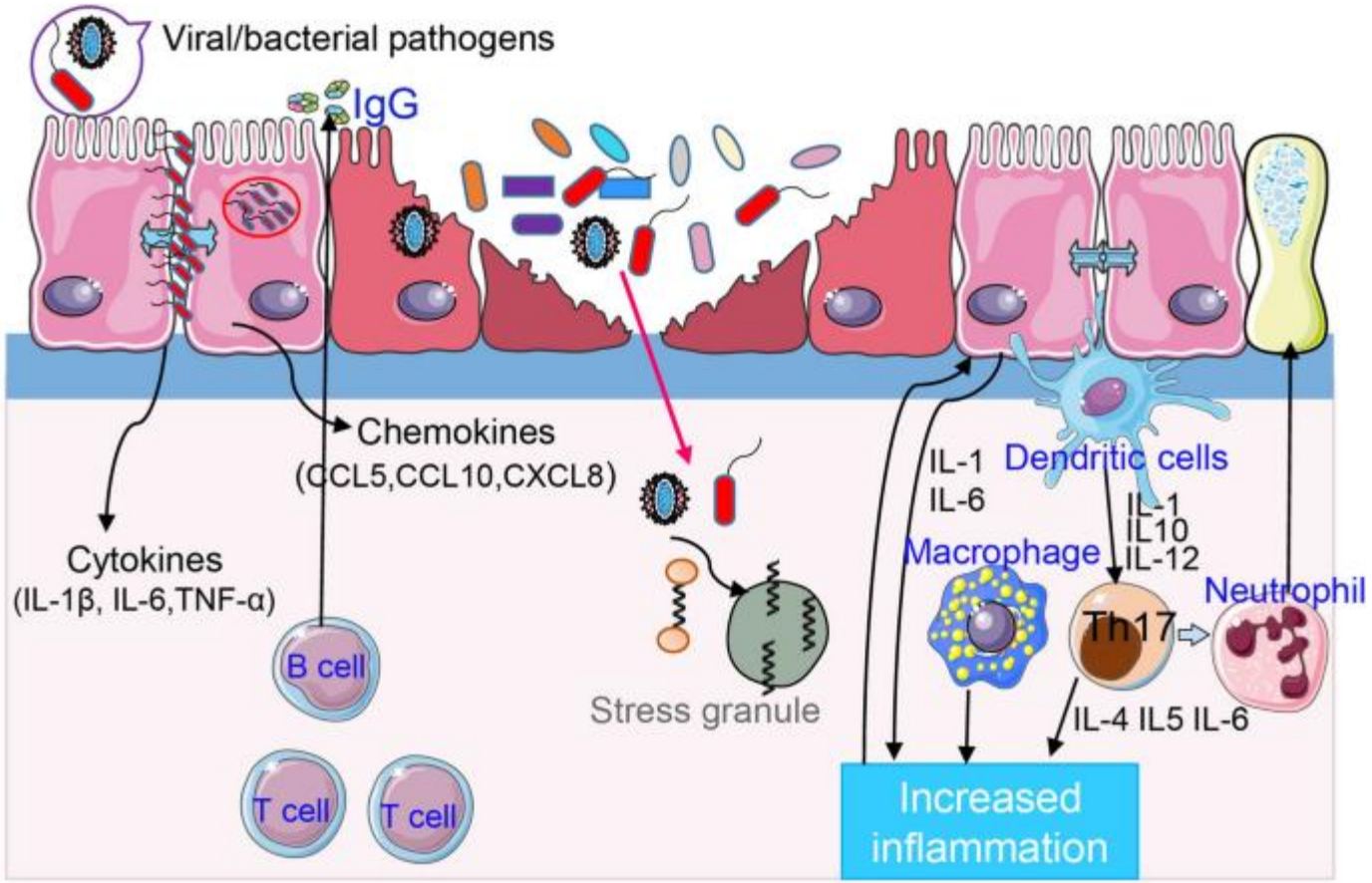






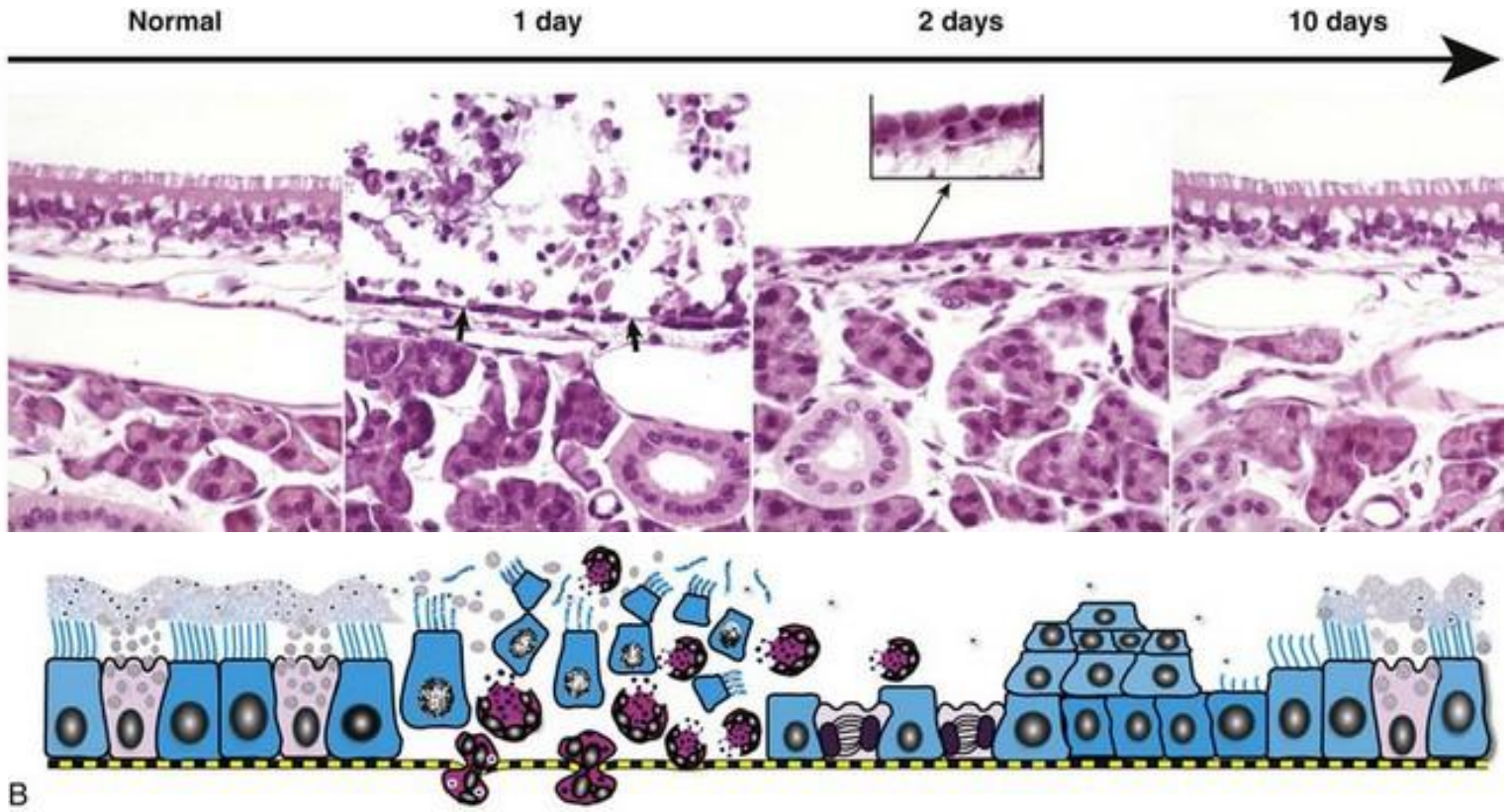
A courtesy Dr. A. López, Atlantic Veterinary College.
B Sims DE, Westfall JA, Kiorpes AL, Horne MM: *Biotech Histochem* 66:173-180, 1991.

Zscita pljuč 2

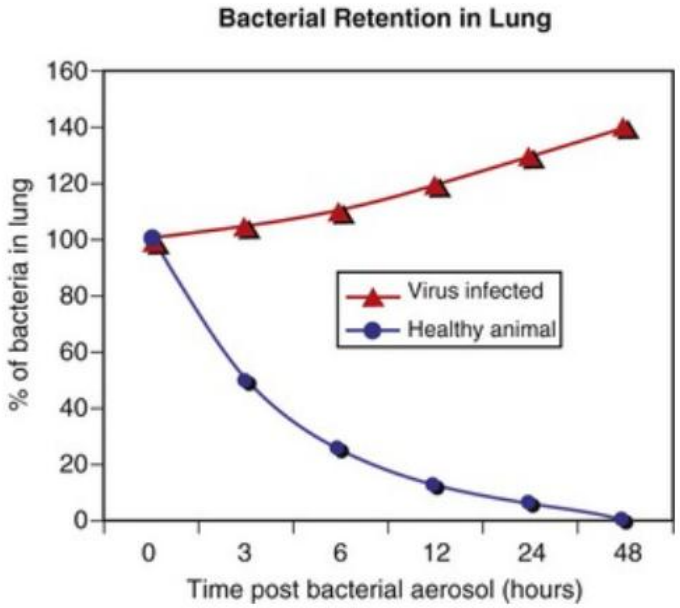


Chai at al. 2022

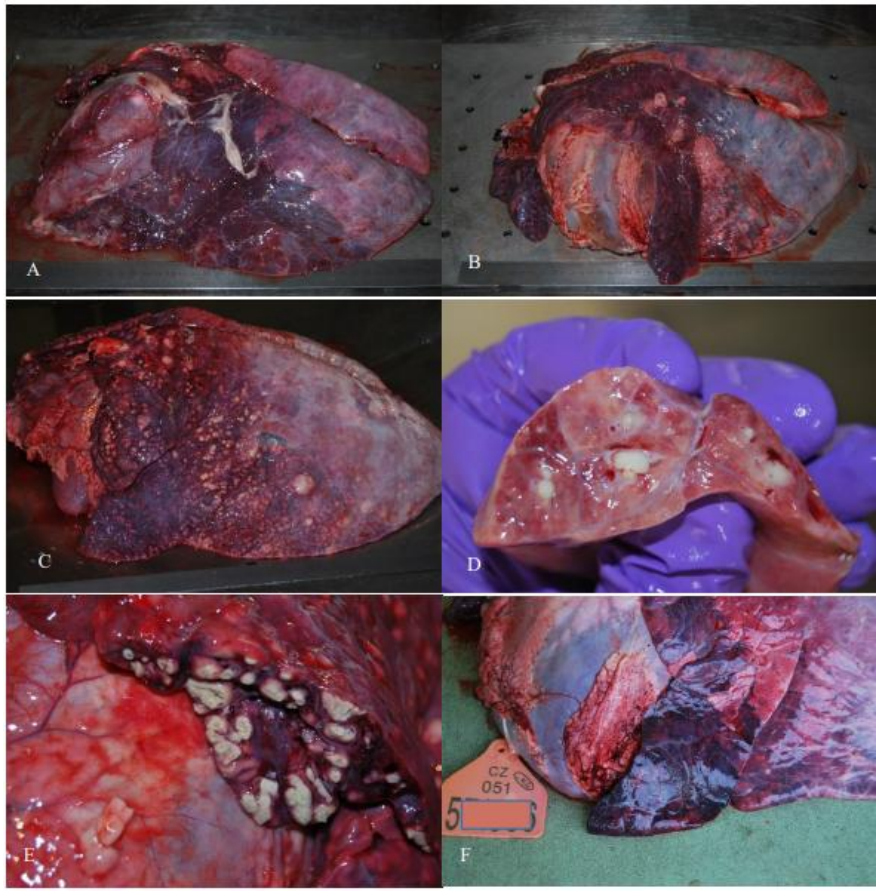
Primarni inzult



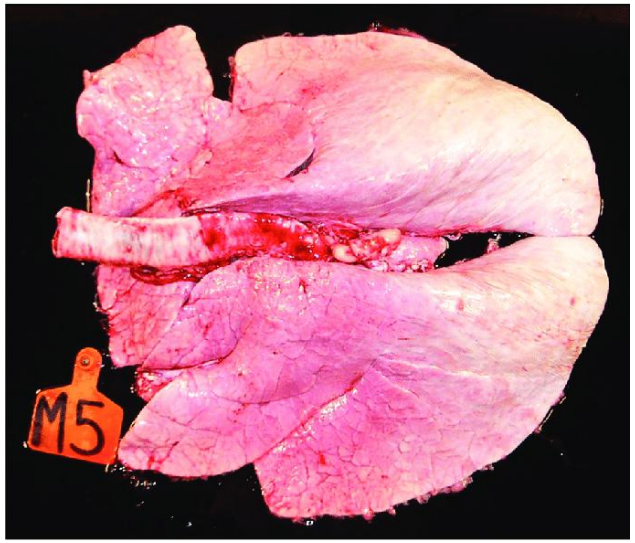
A López A, Prior M, Yong S et al: *Am J Vet Res* 49:1107-1111, 1988;
B Dr. A. López, Atlantic Veterinary College

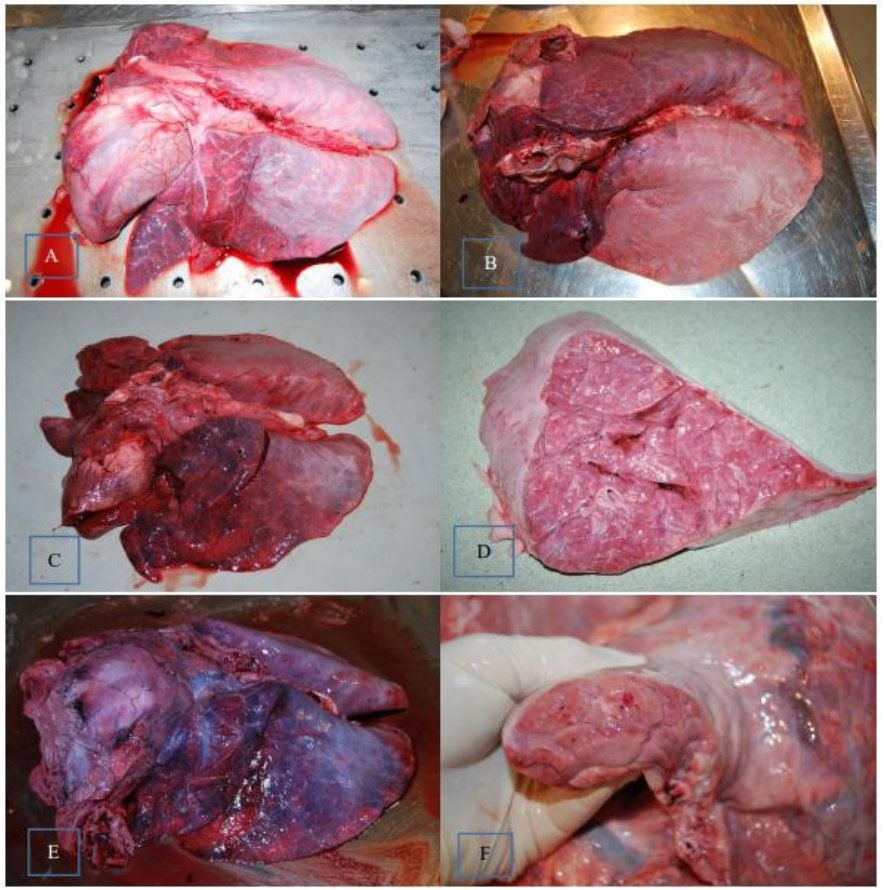


Patologija



Bronhopneumonija





Intersticijska pljučnica

Paller 2019

Klinična slika

https://www.msd-animal-health-hub.co.uk/brd

Klinična prezentacija

Klinična slika-kdaj je potrebno zdravljenje?

SCHOOL OF VETERINARY MEDICINE
University of Wisconsin-Madison

Calf Health Scoring Criteria			
0	**1**	**2**	**3**
Rectal temperature			
100-100.9	101-101.9	102-102.9	≥103
Cough			
None	Induce single cough	Induced repeated coughs or occasional spontaneous cough	Repeated spontaneous coughs
Nasal discharge			
Normal serous discharge	Small amount of unilateral cloudy discharge	Bilateral, cloudy or excessive mucus discharge	Copious bilateral mucopurulent discharge

Eye scores			
Normal	Small amount of ocular discharge	Moderate amount of bilateral discharge	Heavy ocular discharge

Ear scores			
Normal	Ear flick or head shake	Slight unilateral droop	Head tilt or bilateral droop

UCDAVIS VETERINARY MEDICINE | UC CE University of California Agriculture and Natural Resources Cooperative Extension | UCDAVIS ANIMAL SCIENCE

Bovine respiratory disease scoring system for pre-weaned dairy calves[1,2,3]

Clinical sign	Score if normal		Score if abnormal (any severity)[4]	
Eye discharge	0		2	
Nasal discharge	0		4	
Ear droop or Head tilt	0		5	
Cough	0	No cough	2	Spontaneous cough
Breathing	0	Normal	2	Rapid or difficult breathing
Temperature	0	< 102.5° F	2	≥ 102.5° F

Add scores for all clinical signs, if total score is ≥ 5, calf may be positive for bovine respiratory disease[3]

1. Love WJ, Lehenbauer TW, Kass PH, Van Eenennaam AL, Aly SS. (2014) Development of a novel clinical scoring system for on-farm diagnosis of bovine respiratory disease in pre-weaned dairy calves. PeerJ 2:e238 https://peerj.com/articles/238
2. Aly SS, Love WJ, Williams DR, Lehenbauer TW, Van Eenennaam AL, Drake C, Kass PH, Farver TB. (2014) Agreement between bovine respiratory disease scoring systems for pre-weaned dairy calves. Animal Health Research Reviews 15: 2 Pages 148-150 http://journals.cambridge.org/repo_A944U150
3. Love WJ, Lehenbauer TW, Van Eenennaam AL, Drake CM, Kass PH, Farver TB, Aly SS. Sensitivity and specificity of on-farm scoring systems and nasal culture to detect bovine respiratory disease complex in preweaned dairy calves. J Vet Diagn Invest. 2016 Mar;28(2):119-28. http://www.ncbi.nlm.nih.gov/pubmed/26796957
4. Any abnormality including, but not limited to, the examples shown in the above pictures.

Download on the App Store | GET IT ON Google Play

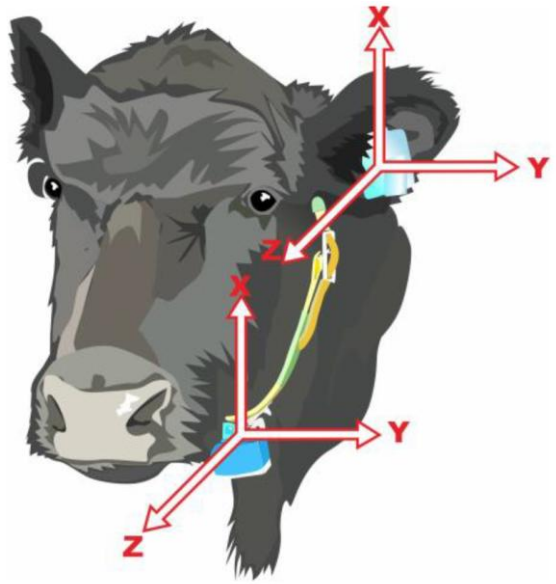
https://www.vetmed.wisc.edu/fapm/wp-content/uploads/2020/01/calf_respiratory_scoring_chart.pdf

Zdravljenje: Seštevek ocen ≥ 5

https://www.vmtrc.ucdavis.edu/

Klinična slika- uporaba moderne tehnologije

- ↓Zaužita količina mleka
- ↓ Hitrost sesanja
- ↓ Število obiskov (z in brez hranjenja)



Zmanjšana aktivnost:

- Ležijo vec
- Daljši čas ležanja, ko se uležejo

Duthie et al., 2021, Morrison et al. 2021

Klinična slika

Kategorija	Klinična slika	Ultrazvok
Zdrava žival	-	-
Oboljenje zgornjih dihal	+	-
Subklinična pljučnica	-	+
Klinična pljučnica	+	+

Posledice

- Strošek zdravljenja
- Zmanjšan apetit
- Potrošnja energije za imunski odgovor
- Pogin
- Konsolidacija in zmanjšana kapaciteta pljuč:
  - Zmanjšan prirast
  - Nižja klavna teža
  - Hitrejša izločitev iz črede
  - Zmanjšana produkcija mleka

Zmanjšan prirast/klavna teža

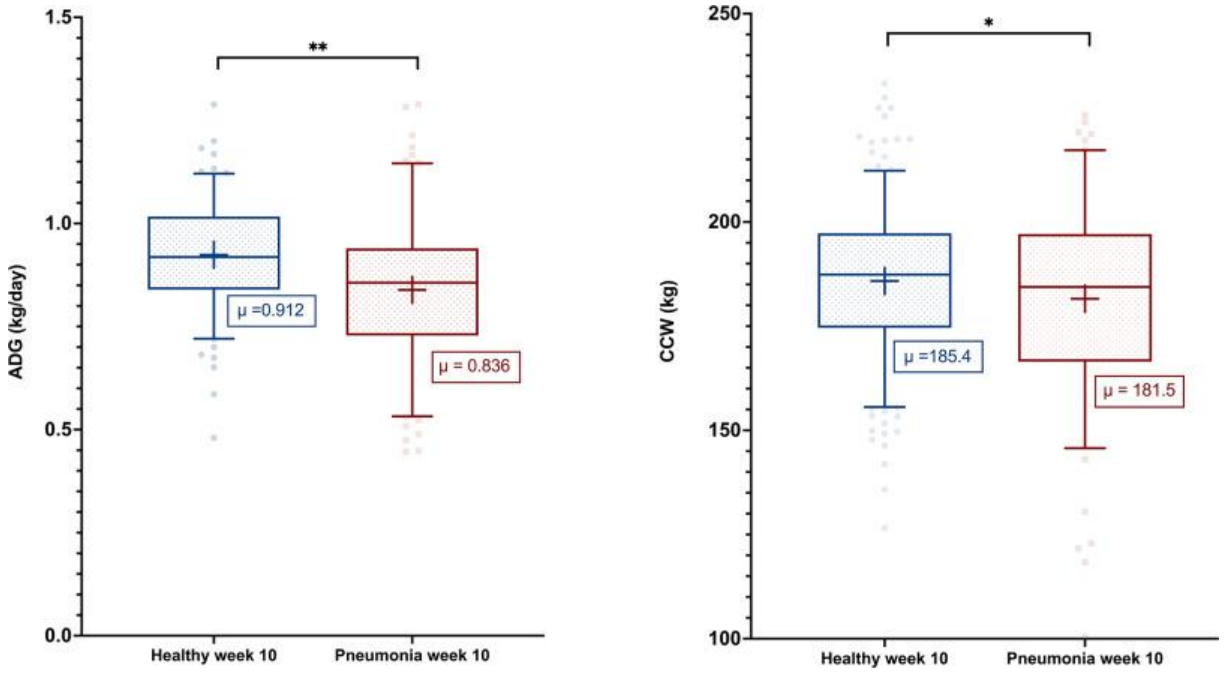
- Dnevni prirast za 76g/dan manjši
- 4 kg manjši klavni izplen
- Konsolidacija >3cm 12.5 kg nižji klavni izple
- Biki do 24 mesecev= 7,04 €/kg (Kmečka borza 9.1.2026)

Journal of Dairy Science
Volume 106, Issue 12, December 2023, Pages 9260-9275

Research

Effect of on-arrival bovine respiratory disease vaccination on ultrasound-confirmed pneumonia and production parameters in male dairy calves: A randomized clinical trial

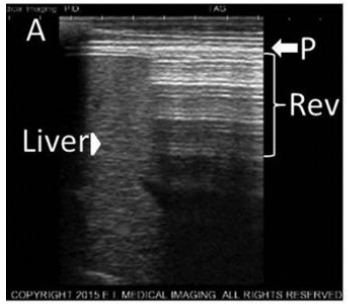
Stan Jourquin [1], Thomas Lowie [1], Florian Debruyne [1], Laurens Chantillon [1], Justine Clinquart [1], Mathilde L. Pas [1], Randy Boone [2], Geert Hoflack [3], Geert Vertenten [3], Bart Sustronck [3], Bart Pardon [1]

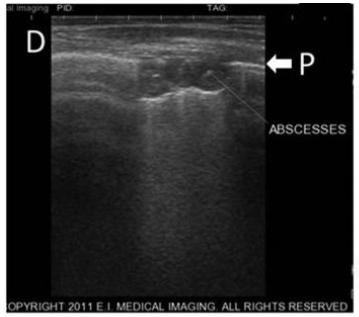


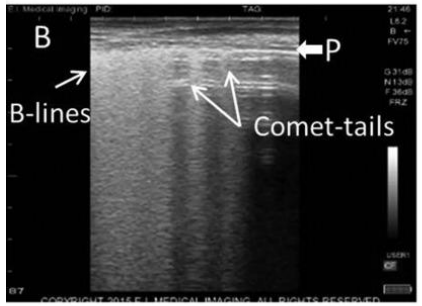
Klanje pri 33 tednih po prihodu (stari 35-36 tedne)

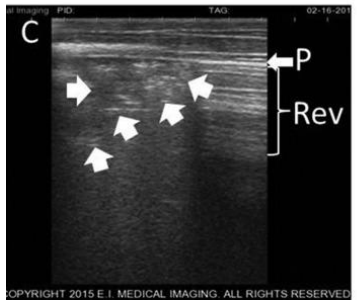
Hitrejsa izločitev iz črede

1 = Zdrava pljuča
2 = Kometi
3 = konsolidacija ≥1 cm but <6 cm;
4 = konsolidacija ≥6 cm, absces, pleuralni izliv (>1 cm)





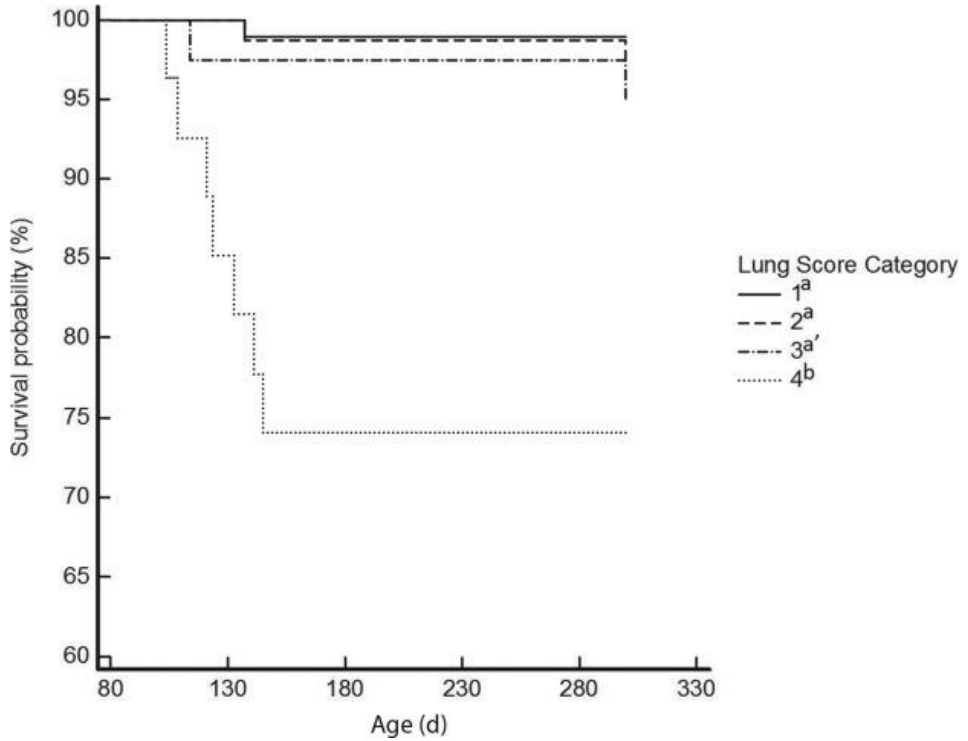




ELSEVIER
Journal of Dairy Science
Volume 99, Issue 2, February 2016, Pages 1465-1470

Short communication: Ultrasonographic assessment of lung consolidation postweaning and survival to the first lactation in dairy heifers

E.A. Adams *, S. Buczinski †



Hitrejša izločitev iz črede

- Več izločenih po prvi osemenitvi
- 4,7 X večja verjetnost za pogin
- 70% verjetnost za obejitev
- V povprečju telijo 7 dni kasneje

ELSEVIER

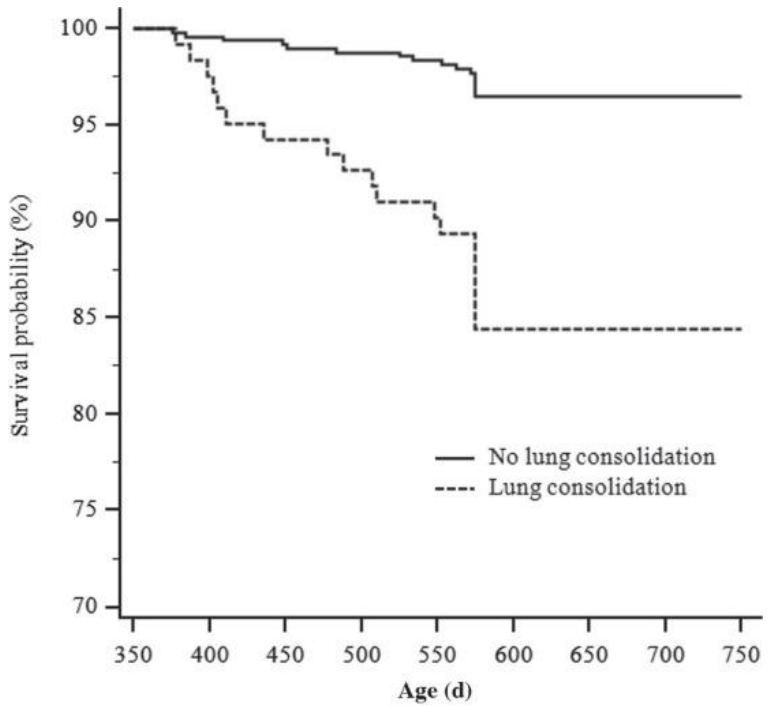
Journal of Dairy Science

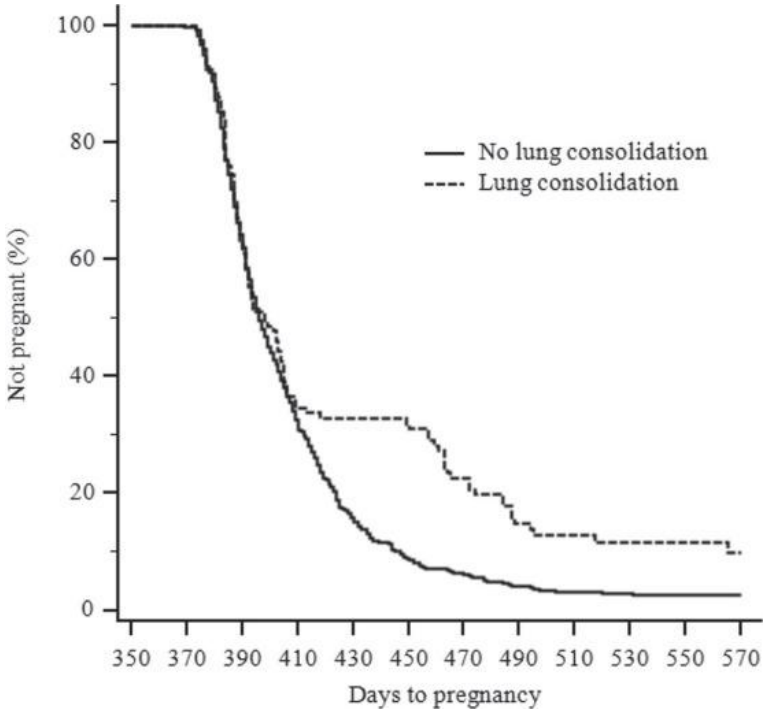
Volume 100, Issue 4, April 2017, Pages 2985-2991

Research

Thoracic ultrasound assessment of lung consolidation at weaning in Holstein dairy heifers: Reproductive performance and survival

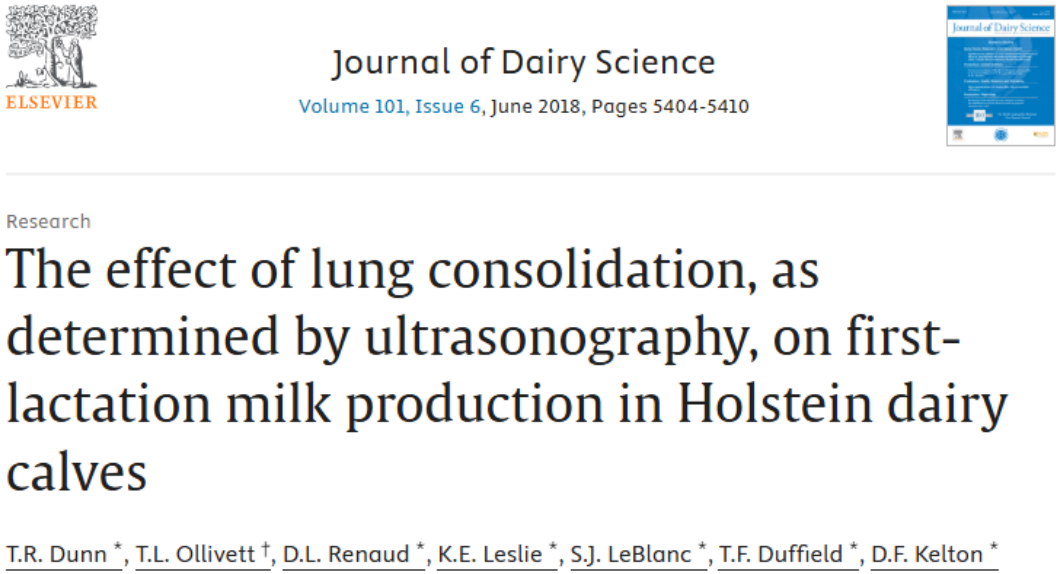
A.G.V. Teixeira, J.A.A. McArt, R.C. Bicalho





Zmanjšana produkcija mleka

- Prvesnice, ki so imele zaznano konsolidacijo pljuč (>3 cm) v prvih 8 tednih življenja so proizvelde 527 kg manj mleka v prvi standardni laktaciji


ELSEVIER

Journal of Dairy Science

Volume 101, Issue 6, June 2018, Pages 5404-5410

Research

The effect of lung consolidation, as determined by ultrasonography, on first-lactation milk production in Holstein dairy calves

T.R. Dunn *, T.L. Ollivett †, D.L. Renaud *, K.E. Leslie *, S.J. LeBlanc *, T.F. Duffield *, D.F. Kelton *

Industrijski cilji (Črno bela pasma)

- Morbidnost pred odstavitvijo <10%
- Mortalnost pred odstavitvijo 2-5%
- Morbidnost po odstavitvi <5%
- Mortalnost po odstavitvi <2%
- Teža ob odstavitvi 2x porodna teža
- Povprečni dnevni prirast 0.8kg/dan

Green in sod. 2012

Primer 11.12.2024

- Anamneza: Povečano število zdravljen in pogina zaradi pljučnic
- Kmetija
  - 350 molznih živali (povprečje 10 270 kg/kravo)
  - 480 telitev na leto (mešanica Holstein in križancev)
  - Križanci se vzrejajo do prodaje v pitališče pri 12 mesecih
  - Cepljenje telet
    - Bovilis intranasal RSP
  - Cepljenje krav
    - MycoB (Mycoplasma)
    - Bovilis BVD
    - Bovilis IBR marker
  - Cilji za kmetijo
    - Zmanjšanje poginov in zdravljen
    - Nadaljevanje reje tako Holstein telet kot tudi križancev

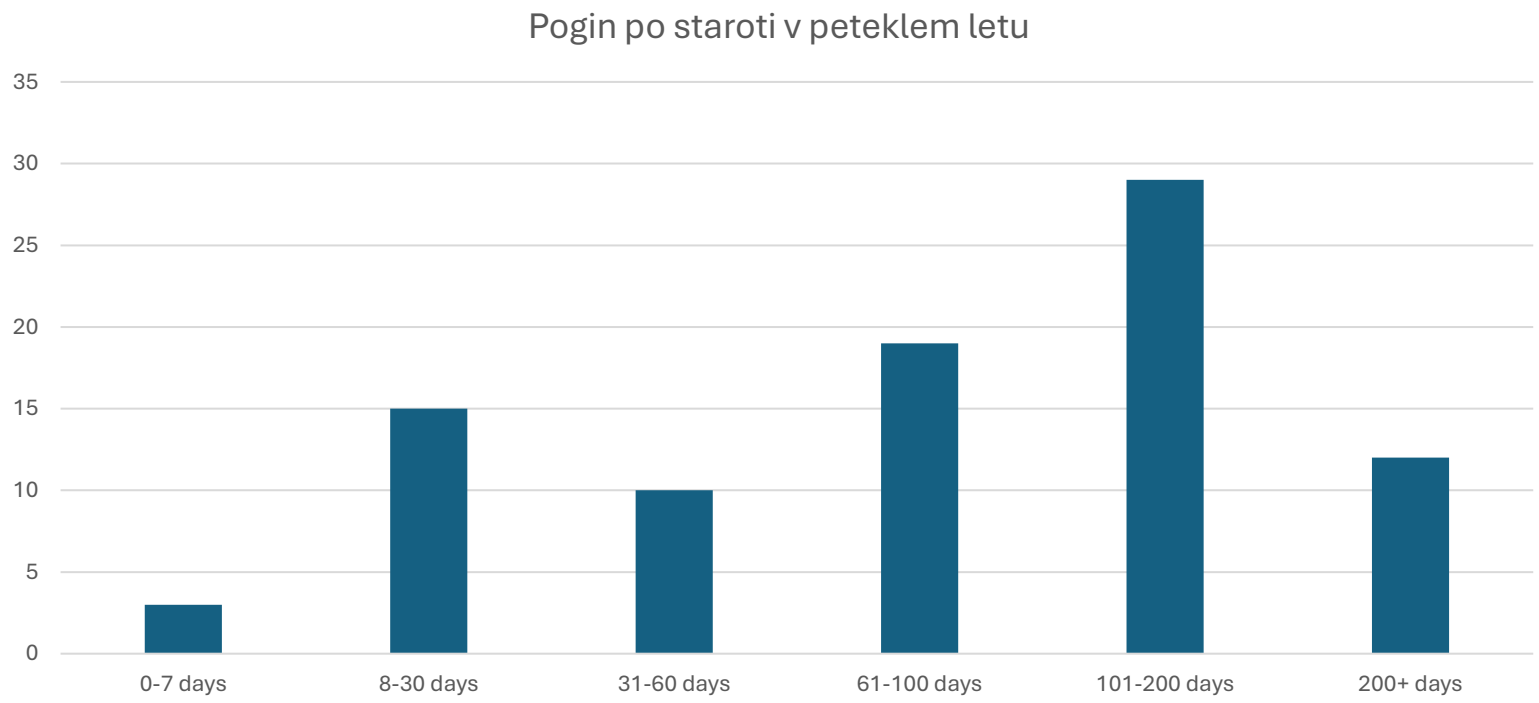
Pregled podatkov

- V 2,5 mesecih je bilo zabeleženih 260 zdravljen

	Oktober	November	December	Skupno
Alamycin (tetraciklin)		11	2	13
Draxxin (tultramicin)	84	89	23	196
Nuflor (florfenikol)	4	18	27	49
Steroids		2		2
Skupno	88	120	52	260

Pregled podatkov

- V zadnjem letu je poginilo 105 telet = 22%
- Od tega 53 Holstein telic




12
10
8
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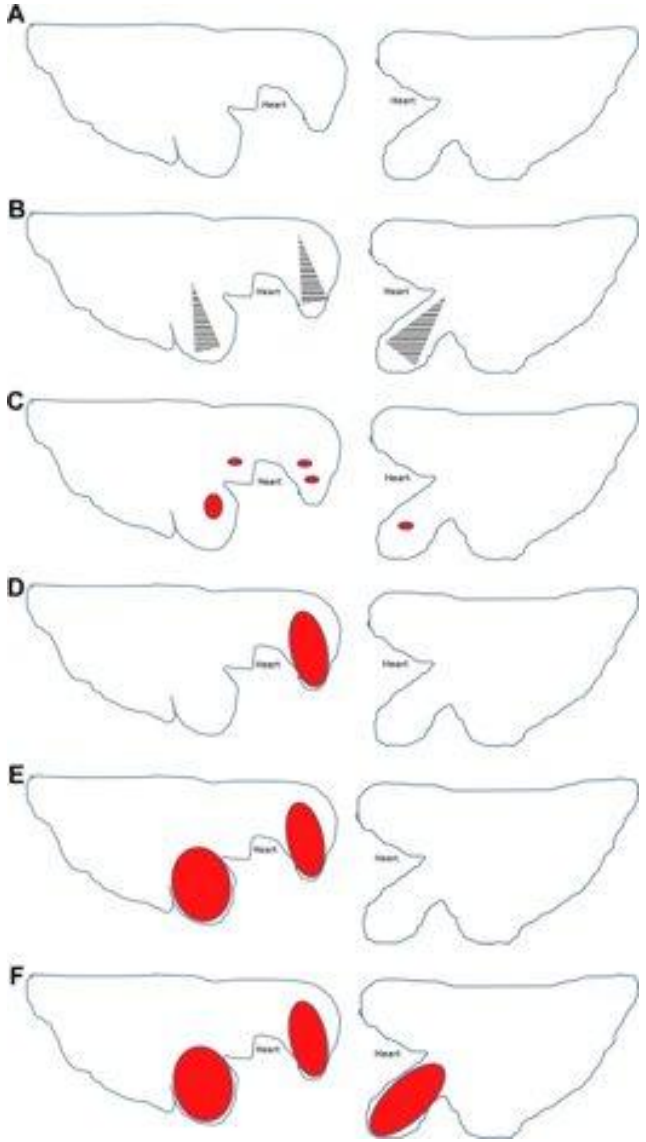
3
12
1
2
11
12

Obisk kmetije

Obisk kmetije

Obisk kmetije

Pen	Datum rojstva	Starost (d)	Pasma	Ultrazvok ocena	Wisconsin ocena	Št. zdravljen
Iglu	03/12/2024	8	AAX	D	2	0
Iglu	02/12/2024	9	AAX	B	1	0
Par	28/11/2024	13	HF	D	4	2
Par	27/11/2024	14	HF	E	1	2
Par	20/11/2024	21	HF	C	2	3
Par	18/11/2024	23	HF	D	2	2
Krmilnik 1	12/11/2024	29	SMX	D	3	2
Krmilnik 1	08/11/2024	33	AAX	F	5	2
Krmilnik 1	03/11/2024	38	BSX	E	3	2
Iglu	02/11/2024	39	SMX	D	3	2
Iglu	27/10/2024	45	SMX	E	3	0
Krmilnik 1	04/10/2024	68	SMX	F	5	3
Krmilnik 1	04/10/2024	68	HF	E	2	4
Krmilnik 2	19/09/2024	83	HF	E	1	1
Krmilnik 2	03/09/2024	99	HF	D	2	1
Krmilnik 2	01/09/2024	101	HF	F	2	4
Krmilnik 2	17/08/2024	116	SMX	C	3	0

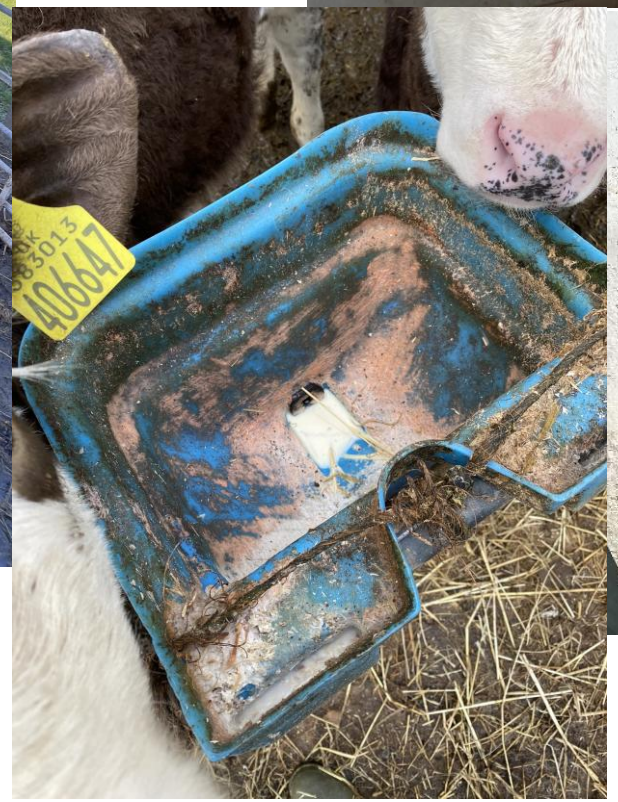


Obisk kmetije

Test	Anamneza	Najdbe
Sekcija	6 mesecev Holstein	<u>Bronhopneumonija</u> Pozitivna: Mycoplasma bovis (PCR) and Pasteurella multocida (bakteriologija).
Sekcija	3 mesece Holstein	<u>Bronhopneumonija</u> Pozitivena: BRSV, CoV, H somni, M. haemolytica, P. multocida & M. bovis
Sekcija	4 mesece Simental X	<u>Bronhopneumonija</u> Pozitivna: H. somni, M. haemolytica, P. multocida & M. bovis.
Nosni bris multiplex PCR	6 telet	4/4 pozitivna: PI3, CoV, P. multocida 2/4 pozitivna: M. bovis
Nosni bris multiplex PCR	2 teleta	2/2 Coronavirus, M. haemolytica, P. multocida ½ M. bovis

Obisk kmetije

- Slaba higijena



Obisk kmetije

- Mešanje telet različnih starosti
- Kontakt preko ograje med različnimi skupinami
- Avtomatski krmilniki mleka
  - Teleta potujejo skozi krmilnike po sistemu en ven en not
- Slaba ventilacija v hlevu z najmlajšimi teleti
- Prenaseljeni hlevi
- Mešanje mleziva večih krav v čebru v hladilniku-kontaminacija z raznimi bakterijami

Obisk kmetije

Priporočila

- Izboljšanje ventilacije oz. premik najmlajših telet iz najslabšega hleva
- All-in-all-out sistem
- Zamrzovanje in pasterizacija mleziva
- Dodatno cepljenje z Bovilis Bovipast RSP (BRSV, PI3, M. haemolytica)
- Izboljšanje higijene krmilnikov
- Zmanjšati gostoto telet oz. povečati kapaciteto kmetije
  - Prodaja križancev pri 10 dneh starosti

Hvala za Vašo pozornost!

Vprašanja?

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