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SUOMEN ELÄINLÄÄKÄRILIITTO
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Fennovet KONGRESSIPALVELU

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1.

Puppyhood and Adolescent Diets as Determinants of Dental Calculus in Adult Dogs: A Cross-Sectional Study in Finland

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Dental calculus (DC) is a common oral health issue in dogs, characterized by significant implications for periodontal disease and overall health. This large cross-sectional study explored whether early-life diets during puppyhood and adolescence influence the risk of DC in adulthood, using owner-reported data from the DogRisk food frequency questionnaire in Finland. The analyses included 5,287 dogs for the puppyhood diet and 3,775 dogs for the adolescence diet. The results indicated that dietary patterns rich in non-processed meat-based diets (NPMD) and low in highly processed carbohydrate-based diets (HPCD) during both developmental stages were significantly associated with a reduced risk of DC in adulthood (OR, 95% CI = 0.727, 0.548–0.965) and (OR, 95% CI = 0.754, 0.694–0.820), respectively. Moreover, exclusive feeding of HPCD during puppyhood was significantly associated with a 5-fold higher likelihood of DC risk in adulthood than was exclusive feeding of NPMD. Furthermore, adding bones and cartilage to HPCD-exclusive feed during puppyhood did not reduce the risk of DC in adulthood. These findings suggest that the composition and processing of early diets may affect dogs' long-term dental health, providing valuable insights into potential primary prevention. Although this study identified an association, causality could not be established. Prospective longitudinal and dietary intervention studies are required.

Conflicts of interest / affiliations: The authors declare no conflicts of interest.

2.

Multimorbidity and Risk Factors of Non-Communicable Diseases in Dogs: A Large Population Study Using the DogRisk Food Frequency Questionnaire

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Non-communicable diseases (NCDs) are recognized as a cause of morbidity and mortality in companion animals. However, epidemiological analyses examining disease burden, multimorbidity, and lifestyle risk factors in dogs remain limited. This study aimed to investigate NCDs prevalence, age of onset, disease course, multimorbidity structure, and factors associated with disease-burden using owner-reported data. Data were obtained from the DogRisk Food Frequency Questionnaire including 10,450 responses. NCDs prevalence, age of onset, chronicity, recurrence, and owner-reported symptoms change after dietary changes were assessed.

Multimorbidity was quantified using ordinal disease categories and a continuous disease count. The later was analyzed using negative binomial regression to identify disease-burden associations. Principal component analysis (PCA) identified disease co-occurrence patterns. Multimorbidity was common within the studied population, with disease-burden increasing with age and varying across sex, breeds, environmental exposures. After diet change, both industrial and raw foods were found effective for certain diseases' symptoms. PCA identified four clusters: RC1, allergic/dermatological disorders; RC2: chronic/metabolic diseases; RC3: musculoskeletal disorders; and RC4: ligament-related disorders, suggesting shared mechanisms or risk factors. Regression analyses identified demographic and lifestyle factors associated with NCD burden. Maternal multimorbidity was associated with a higher incidence rate ratio (IRR) of offspring disease-burden later in life. Raw food as the first solid diet, puppyhood, and adolescence diet, were associated with lower IRR, whereas dry food consumption was associated with higher IRR. Overweight dogs also had higher IRR than normal- and under-weight dogs. These findings highlight the epidemiology of chronic diseases in dogs and the importance of large-scale datasets for understanding canine health.

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3.

Lemmikkikanien fyysisen aktiivisuuden arviointi aktiivisuusmittarin avulla

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Kanit voivat saaliseläiminä piilottaa sairauden tai kivun merkkejä. Vähentynyt aktiivisuus voi olla merkki niiden heikentyneestä terveydentilasta. Objektiiviset aktiivisuuden arviointimenetelmät voisivat siten tukea kanien terveyden ja hyvinvoinnin seurantaa. Tämän tutkimuksen tavoitteena oli selvittää, voidaanko aktiivisuusmittarilla arvioida kanien fyysistä aktiivisuutta ja erottaa liikkuminen paikallaanolosta.

Tutkimukseen osallistui 20 yksityisomistuksessa olevaa kania. Kaneja seurattiin niiden kotiympäristössä rajatussa tilassa samanaikaisesti videokuvaamalla ja valjaiden selkäpuolelle kiinnitetyllä Axivity AX3-aktiivisuusmittarilla, joka mittaa kiihtyvyyksiä kolmessa suunnassa. Jokaisesta kanista tallennettiin kaksi 30 minuutin seurantajaksoa aamulla ja illalla, jolloin niiden oletettiin olevan aktiivisimmillaan.

Videotallenteet analysoitiin CowLog-ohjelmistolla tutkimusta varten laaditun etogrammin avulla, joka sisälsi ennalta määritellyt kanin fyysisen käyttäytymisen luokat, kuten liikkumisen ja paikallaanolon.

Videotallenteiden käyttäytyminen luokiteltiin näiden luokkien perusteella ja tallennettiin Excel-aineistoksi. Aktiivisuusmittari rekisteröi kiihtyvyyttä 100 kertaa sekunnissa ja tästä saatu raakadata muunnettiin yhden sekunnin keskiarvotetuiksi MAD-arvoiksi (mean amplitude deviation). Käyttäytymisluokkia ja MAD-arvoja sisältävät Excel-aineistot yhdistettiin aikaleimojen perusteella. Näin kullekin sekunnille määritetty käyttäytymisluokka voitiin yhdistää vastaavan sekunnin kiihtyvyysarvoon, minkä avulla MAD-arvoja voitiin verrata eri käyttäytymisluokkien välillä.

Liikkumisen MAD-arvojen keskiarvo ja mediaani olivat 97 ja 63 mG, kun taas paikallaanolon vastaavat arvot olivat 39 ja 19 mG. Jos tarkasteltiin pelkästään kiihtyvyysaluetta 1–10 mG, paikallaanolon vetosuhde (odds ratio) oli 6.1 (95 % luottamusväli 5.8–6.4) fyysistä aktiivisuutta eri muodoissa sisältäviin luokkiin verrattuna. Paikallaanolon aikana havaittuja korkeampia kiihtyvyysarvoja voivat osaltaan selittää esimerkiksi levon aikaiset asennonkorjaukset, jotka tuottavat mitattavaa liikettä ilman varsinaista etenemistä.

Tulokset osoittavat, että aktiivisuusmittari pystyy erottamaan kanin liikkumisen ja paikallaanolon liikkeen voimakkuuden perusteella. Menetelmä tarjoaa objektiivisen tavan arvioida kanien fyysistä aktiivisuutta ja voi tulevaisuudessa tukea automaattisten aktiivisuuden ja hyvinvoinnin arviointimenetelmien kehittämistä.

4.

Bile reflux in dogs with chronic upper gastrointestinal signs

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Bile reflux (BR) is defined as the retrograde flow of duodenal contents, including bile, into the stomach. Based on etiology, BR can be classified as primary or secondary reflux. The latter is observed after gallbladder, biliary tract, or gastric surgery, whereas no such predisposing event is involved in primary reflux. In humans, BR is associated with upper gastrointestinal signs and bile gastritis (BG). Chronic upper gastrointestinal signs are common in dogs, but studies investigating BR as a potential underlying cause are scarce.

This retrospective observational study aimed to estimate the prevalence of BR in dogs with chronic upper gastrointestinal signs and to describe the signalment, clinical signs, laboratory, ultrasonographic and esophagogastroduodenoscopy findings, and histopathology of gastric mucosal biopsies in these dogs. Study population consisted of 289 client-owned dogs with chronic upper gastrointestinal signs undergoing esophagogastroduodenoscopy between October 1, 2014, and October 1, 2024, in Helsinki University Small Animal Hospital. Based on a database search, dogs with at least one chronic upper gastrointestinal sign in which BR was observed during endoscopy were included in the study.

BR was endoscopically diagnosed in 95/289 dogs with chronic upper gastrointestinal signs, resulting in a 32,9% prevalence. BR was primary in 96,8% and secondary in only 3,2% of the cases. Interestingly, bile was detected as a floating bile lake in 33,7% and as a sticky bile stain on the gastric mucosa in 66,3% of the dogs, the latter associated with a more severe BG in humans. In the gastric mucosal histopathological examination, elongated, tortuous and hyperplastic gastric pits were found in 66,0% and no or mild inflammation in 53,2% of dogs, consistent with BG in humans.

In conclusion, this study showed that BR is common in dogs with chronic upper gastrointestinal signs. In addition, findings consistent with BG in humans were also identified in dogs.

5.

Comparison of diagnostic methods and joint pain intensity in canine shoulder osteochondritis dissecans

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Introduction: Diagnosis of canine shoulder osteochondritis dissecans (OCD) relies on clinical signs and diagnostic imaging. However, studies comparing imaging-based lesion measures with joint pain intensity are lacking. This study aimed to assess the diagnostic performance of radiography, ultrasound (US), and computed tomography (CT) for canine shoulder osteochondrosis (OC) and OCD, and to evaluate associations between imaging findings and joint pain intensity.

Methods: In this prospective, blinded clinical study, dogs with uni- or bilateral shoulder OC/OCD were evaluated for lameness, pain on palpation, and passive range of motion. All dogs underwent shoulder radiography, US, and CT. Eligible dogs had arthroscopy, and a subset proceeded to mini-arthrotomy.

Results: Twenty-five dogs (50 shoulders) were enrolled; OCD lesion measurements at mini-arthrotomy were obtained for 11 dogs (15 shoulders). Sensitivity and overall accuracy for identifying OC/OCD were high across all modalities. CT was the most accurate for detecting cartilage flaps and intra-articular loose bodies. Joint pain intensity was associated with lesion length and width across modalities, and with cartilage flaps on radiography and loose bodies on US and CT. Lesion depth and location were not associated with joint pain intensity.

Conclusion: In conclusion, CT is a more accurate imaging modality than radiography or US for evaluating shoulder OC/OCD. Longer or wider lesions may be associated with greater joint pain intensity than shorter or narrower lesions, irrespective of lesion depth.

6.

The Dog Diet, Health & Lifestyle Questionnaire: A Citizen-Science Approach to Investigating Canine Health Across the Life Course

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Canine health is shaped by interacting dietary, environmental, lifestyle, and care-related factors across the life course, but sufficiently detailed datasets for investigating these relationships remain limited. The DogRisk research group at the University of Helsinki developed the international Dog Diet, Health & Lifestyle Questionnaire (DDHLQ) to collect comprehensive owner-reported data and identify potentially modifiable factors associated with canine health and disease. The first DDHLQ is a retrospective questionnaire for adult and senior dogs, with no eligibility restrictions beyond life stage. It records information chronologically from the maternal and newborn periods through puppyhood, adolescence, adulthood, and, when applicable, senior age. Survey domains include maternal and breeder-related factors, diet and feeding practices, health and medical history, lifestyle and daily activities, environmental and living conditions, care routines, and wellbeing. The questionnaire includes over 10 000 question fields, with respondents filling in only those applicable to their dogs. All kinds of dogs, health statuses, lifestyles, and feeding practices are included to capture real-world variation. Data are collected using REDCap, stored on protected University of Helsinki servers, processed in anonymised form, and managed in accordance with the EU General Data Protection Regulation. Development of the DHLQ has resulted in a multidimensional citizen-science instrument designed to support analyses of life-course exposures and health outcomes. The questionnaire will be available for pilot testing to volunteers in autumn 2026, will then be validated and opens to all interested later in the year. The resulting dataset is expected to generate hypotheses, identify potential risk and protective factors, and guide future longitudinal and mechanistic research. Although retrospective owner-reported data may be affected by recall and selection bias, the questionnaire's inclusive design and detailed life-course coverage may provide a scalable basis for evidence-informed strategies to prevent chronic disease and improve canine health, longevity, and quality of life.

The authors declare no conflicts of interest.

7.

Treatment of superficial digital flexor tendon luxation in 200 shetland sheepdogs in Finland

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Current literature on management of superficial digital flexor tendon (SDFT) luxation in Shetland sheepdogs has focused on case reports describing different surgery methods. We conducted a comprehensive survey describing treatment, complications, and outcome in Finnish Shetland sheepdogs diagnosed with SDFT luxation.

Data on all Shetland sheepdogs diagnosed with SDFT luxation in 2013–2022 were collected from patient database of a veterinary clinic chain. Treatment methods, complications and outcome were analysed.

SDFT luxation was diagnosed in 200 Shetland sheepdogs (245 affected limbs). Surgically treated were 199 limbs. Surgical techniques included retinaculum suturing alone (55) or combined with calcaneoplasty (78), attachment of tendon to bone with screw (25), suturing the tendon to the bone tunnels (16) or screw at lateral border of the tuber calcanei (5). Post operatively the limb was immobilised in 184 cases. Conservatively were treated 36 cases. There was no information about treatment in ten cases.

There were 24 minor and 69 major complications: 53 of the complications were related to bandaging. Re-luxation was observed in 24 cases, of which 16 were initially operated on by suturing the retinaculum only. Median follow-up time was 42 days ranging from 0 – 3201 days. Of the 108 cases that had adequate follow-up information 71 had full, 32 acceptable and 5 unacceptable function as evaluated by veterinary professional.

In our study population, there was considerable variation in surgical techniques and postoperative care. Outcome is good despite high complication rate. Most complications resolved with medical management.

Conflict of interest: The authors have no conflict of interest to declare.

Ethical approval: The Research Ethics Committee on Animal Research of the University of Helsinki reviewed and approved the study ethics.

8.

The DogRisk Obesity Trial: Weight and Metabolic Responses to Raw Meat-based and Kibble Diets

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Abstract

This randomised study examined how diet composition, daily calorie allowance and baseline weight status were associated with changes in body weight and metabolic, clinical and immune serum markers in client-owned dogs.

Dogs received raw meat based or extruded dry (kibble) diets for 10 weeks, with 29 crossing over for another 10 weeks. Primary comparisons included 53 dogs (raw, n=28; dry, n=25): 23 within −10% to <10% of target weight, 10 at 10–<20% above target and 20 at ≥20% above target. Daily energy allowances were set to maintain body weight in dogs near their target weight and promote weight loss in those above it. Serum nuclear magnetic resonance (NMR) metabolomics was assessed alongside weight trajectories, clinical chemistry, haematology and immune markers.

Above-target dogs lost weight on both diets, 23/29 crossover dogs were within the normal target range before Period 2. Diet-associated metabolic differences were largest in normal-weight dogs and prominent after crossover. Kibble feeding was associated with higher triglyceride-rich lipoprotein concentrations, whereas raw feeding was associated with higher LDL cholesterol and particle concentrations after crossover. Normal-weight kibble-fed dogs showed increases in triglyceride-rich features resembling those observed in above-target dogs at baseline.

These preliminary findings indicate diet-associated metabolic differences despite comparably fa weight management on both diets. Feeding level may influence their magnitude, but its contribution cannot yet be separated from baseline weight status.

9.

POISSA

10.

Online survey of signs of sleep-disordered breathing and other sleep disorders in brachycephalic and non-brachycephalic dogs

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Various sleep disorders, including sleep-disordered breathing (SDB) and rapid eye movement sleep behavior disorder (RBD), exist in dogs. SDB occurs mainly in brachycephalic dogs. RBD, where muscular atonia during rapid eye movement sleep is lacking, remains largely unexplored. The aim of this study was to describe and identify owner-perceived signs of sleep disorders in dogs.

An online questionnaire was developed, consisting of six parts: demographics, medical history, sleeping customs, signs of SDB, and signs of other sleep disorders. Signs of SDB (snoring, changing sleeping positions, sleeping sitting up or with toy in mouth or upside down, loud breathing sounds while sleeping, waking up gasping, and apneic episodes during sleep) were summarized as the SDB score. Signs of RBD (violent twitching, howling, growling, barking, and aggression during sleep) were summarized as the RBD score. Daytime sleepiness was evaluated. For some dogs, SDB recordings using the Nukute neckband (Nukute Ltd., Oulu, Finland) were performed. Obstructive Respiratory Event Index (OREI) value was used to summarize the average number of SDB episodes per hour in these dogs.

452 questionnaire answers were obtained and SDB recordings were done in 59 dogs. Brachycephalic dogs had a significantly higher SDB score compared to non-brachycephalic dogs ($p < 0.0001$). Dogs with OREI over two had a significantly higher SDB score compared to dogs with OREI under two ($p = 0.0004$). There was no significant difference in daytime sleepiness between brachycephalic and non-brachycephalic dogs ($p= 0.05$) or between dogs with OREI over and under two ($p = 0.33$). Non-brachycephalic dogs had a significantly higher RBD score compared to brachycephalic dogs ($p = 0.003$).

In conclusion, brachycephaly increases owner-perceived signs of SDB. Daytime sleepiness detected by owners seems not to be connected to brachycephaly or an increased OREI value. Signs of RBD are reported more frequently in non-brachycephalic dogs.

11.

Kliiniset ja elektrofysiologiset tekijät vaikeahoitoisen epilepsian ennustajina koirien idiopaattisessa epilepsiassa

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Idiopaattinen epilepsia (IE) on koirien yleisin pitkäaikainen neurologinen sairaus. Huolimatta asianmukaisesti valitusta kohtauksenvastaisesta lääkityksestä terapeuttisilla annoksilla, noin kolmasosalla koirista epilepsia on vaikeahoitoinen eli lääkeresistentti. Tällä hetkellä lääkeresistentti epilepsia tunnistetaan vasta, kun hoito on jo epäonnistunut. Kliinisessä työssä ei ole käytettävissä varoitusjärjestelmää, jonka avulla voitaisiin jo varhaisessa vaiheessa tunnistaa ne idiopaattista epilepsiaa sairastavat koirat, joilla todennäköinen hoitovaste on huono.

Tutkimuksen tavoite oli tunnistaa varhaisia kliinisiä ja elektrofysiologisia tekijöitä, joilla voitaisiin ennustaa lääkeresistenttiä epilepsiaa koirilla, jotka sairastavat idiopaattista epilepsiaa.

Prospektiivinen kohorttitutkimus, joka toteutettiin Helsingin yliopistollisessa pieneläinsairaalassa. Tutkimukseen kerättiin koiria, joilla oli puhjennut epilepsia, eikä vielä aloitettu kohtauksenvastaista lääkitystä. Ensimmäisellä käynnillä vahvistettiin IE-diagnoosi, eli rakenteelliset ja reaktiiviset epilepsian aiheuttajat poissuljettiin diagnostisin menetelmin kansainvälisen eläinlääketieteellisen epilepsiatyöryhmän (IVETF) Tier II -luotettavuustasolla. Lisäksi koirille, jotka sietivät ihonalaisten elektrodien asettamisen, tehtiin hereillä 50 minuutin videoaivosähkökäyrätutkimus (video-EEG). Koirille aloitettiin kohtauksenvastainen lääkitys, video-EEG toistettiin 3 kuukauden kuluttua, kohtauksenvastaista lääkitystä säädettiin tarvittaessa, ja hoitovaste määritettiin 12 kuukauden seurantajakson lopussa. Kliinisiä ja elektrofysiologisia muuttujia tutkittiin mahdollisina lääkeresistentin epilepsian ennustetekijöinä vertaamalla lääkehoitoon vastaavia ja lääkeresistenttejä koiria tilastollisin menetelmin.

Tutkimukseen otettiin 62 koiraa. Monimuuttujaisessa logistisessa regressioanalyysissä epilepsian esiintyminen suvussa oli yhteydessä lääkeresistenttiin epilepsiaan (odds ratio 4.06; $P = 0.04$). Video-EEG tehtiin 34 koiralle. Koirat, joilla EEG oli epänormaali (4/34), vastasivat hoitoon, kun taas kaikilla lääkeresistenttiä epilepsiaa sairastavilla koirilla EEG oli normaali. Lisäksi puuttuva hoitovaste ensimmäiseen epilepsialääkkeeseen ennusti lääkeresistenttiä epilepsiaa (Fisherin tarkka testi; $P < 0.0001$).

Epilepsian esiintyminen koiran suvussa ennusti lääkeresistenttiä epilepsiaa, mikä voi viitata mahdolliseen geneettiseen komponenttiin, joka vaikuttaa hoitovasteeseen. 50 minuutin hereillä tehty video-EEG tutkimus ei tuonut lisäarvoa lääkeresistentin epilepsian ennustamiseen. Puuttuva hoitovaste ensimmäiseen epilepsialääkkeeseen oli vahvin ennustava tekijä heikolle hoitovasteelle. Käytännön näkökulmasta nämä ennustetekijät voivat auttaa eläinlääkäriä tunnistamaan koirat, joilla todennäköinen hoitoennuste on varauksellisempi sekä keskustelemaan omistajien kanssa hoito-odotuksista silloin, kun koira ei vastaa hoitoon ensimmäisellä kohtauksenvastaisella lääkkeellä tai taustalla on tiedossa oleva epilepsian esiintyminen suvussa.

Sidonnaisuudet ja eturistiriidat: Tutkimuksen tekijä Meri Nurmi on saanut Orionin Tutkimussäätiöltä ja kahdesti Suomen Eläinlääketieteen säätiöltä henkilökohtaisen tutkimusapurahan. Muita sidonnaisuuksia tai eturistiriitoja ei ole.

12.

Hypotension during sevoflurane anaesthesia in dogs premedicated with medetomidine and vatinoxan: a retrospective study

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Clinical and experimental studies have shown variable results concerning incidence of arterial hypotension (MAP below 60 mmHg) during general anaesthesia, when medetomidine and vatinoxan have been used as preanaesthetic medication.

Anaesthetic records of all dogs premedicated with medetomidine and vatinoxan and anaesthetized with sevoflurane during years 2023-2025 in Veterinary Teaching Hospital, University of Helsinki were obtained from electronic patient database. For each case, lowest recorded MAP during general anaesthesia was extracted. If hypotension was detected, duration of and attempted treatments for hypotension, and response to given treatments were recorded. Treatment was considered successful if MAP increased above 60 mmHg and no further treatments had been given.

420 anaesthesia records met the inclusion criteria, presenting marked variation across age, weight, procedures and duration of anaesthesia. Most cases (84%) were American Society of Anesthesiologist physical status I or II. MAP was measured noninvasively in majority (98%) of cases. Hypotension was detected in 171 cases, giving 41% incidence (95% confidence interval 36 – 45%). Median (range) duration of hypotension was 10 (5 – 105) minutes. Treatment for hypotension was instituted in 144 cases. Used treatments were intravenous fluid bolus (106 cases, effectiveness 40%), anticholinergic drug (49 cases, effectiveness 55%), sevoflurane reduction (44 cases, effectiveness 16%), ephedrine (44 cases, effectiveness 43%), noradrenaline infusion (39 cases, effectiveness 97%) and dobutamine infusion (10 cases, effectiveness 90%). In 97 cases (67%) more than one treatment was used.

Noradrenaline and dobutamine infusions are the most effective treatment methods for arterial hypotension during sevoflurane anaesthesia in dogs, when medetomidine and vatinoxan have been used as preanaesthetic medication. In majority of cases more than one intervention was necessary to resolve hypotension.

13.

Canine cognitive dysfunction syndrome – are there specific neuropathological findings?

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Cerebral beta-amyloid (Aβ) deposition occurs both in normal canine aging and in Canine cognitive dysfunction syndrome (CCDS). Currently, the neuropathological changes specific to CCDS are poorly defined. This study aimed at identifying histopathological findings associated with CCDS, focusing first on Aβ distribution. We hypothesized that vascular Aβ deposition is specifically associated to CCDS.

The cognitive status of 49 aged dogs (8–17 years) was assessed by the Canine Cognitive Dysfunction Rating Scale (CCDR), scores ≥50 indicating cognitive impairment. We visualized Aβ in post-mortem brain sections using immunohistochemistry (anti-β-amyloid, clone 4G8) and quantified the total Aβ load, leptomeningeal Aβ, capillary Aβ density, and the capillary-to-total Aβ ratio in frontal, occipital, and entorhinal cortex, hippocampus, and thalamus using digital image analysis (QuPath). Results were analyzed using linear regression, with CCDR score as the dependent variable, and adjusted with age.

Occipital leptomeningeal Aβ load and capillary-to-total Aβ ratio in the occipital cortex were significantly associated with increasing CCDR scores ($p < 0.05$) in age-adjusted analysis. The total Aβ load was not a significant factor in any region.

We aimed to find Aβ-deposition patterns specifically associated with CCDS, in aging dogs. Our study is based on a substantial canine cohort with known cognitive status and included age as a confounder in the analysis. The results indicate that the occipital cortex may represent a relevant region and vascular-associated Aβ pathology may be a specific histopathological feature of CCDS in dogs.

Conflicts of interest: The authors declare no conflicts of interest.

14.

Anomaly of pubic symphysis and obturator foramen in a family of ten Shetland Sheepdogs

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Shetland Sheepdog is one of the most popular breeds in agility sports where speed, strength, coordination, and endurance are required. Pelvis has several functions also in motion, and its functional problems can cause pain and dysfunction. Pubic bone aplasia is recognised in humans and is occasionally associated with other skeletal and soft tissue abnormalities including hip dysplasia and undescended testis. We describe a previously unreported anomaly of pelvic symphysis (PS) and obturator foramen (OF) in a family of Finnish Shetland Sheepdogs.

Anomalies were found in radiographs of nine out of ten closely related adult Shetland Sheepdogs (sire, dam, their three puppies, and four dam's littermates). Anomalies included deficits in the central part of PS (n=5) and asymmetry of the OF (n=6). The anomalies differed in severity, and two dogs had both anomalies. Four dogs had visited orthopaedic surgeon and physiotherapist/ osteopath due to hindlimb gait or pelvic pain problems: all dogs (three) with large PS defects (two with additional asymmetric OF) and one dog with only asymmetric OF.

Anomalies of pelvic symphysis and obturator foramen were common in a family of ten Shetland Sheepdogs. As clinical relevance and true prevalence of this anomaly in the breed are yet unknown, further studies are needed.

Authors have no conflicts of interest to declare.

15.

Heritability of recurrent bacterial pneumonia in Irish Wolfhounds

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An increased incidence of bacterial pneumonia has been reported in Irish wolfhound (IWH) breed and up to half of IWHs with pneumonia continue to later develop recurrent pneumonias. Etiology of recurrent pneumonia in IWHs is not fully understood, but bronchiectasis development has been described as a common feature. As this condition affects almost exclusively IWHs, a hereditary background was suspected.

Privately owned IWHs with recurrent bacterial pneumonia (n=44) and IWHs which had never experienced pneumonias (n=141) were included in this study. Pedigree data for the dogs was obtained from the Finnish and Swedish Kennel club's databases and combined for the analysis. The entire data comprised of 2761 ancestral dogs and after removal of non-informative ancestors, 1821 individuals were included in the variance component analysis. Inbreeding coefficients were calculated using RelaX2 software for pedigree analysis. Variance components were estimated by the restricted maximum likelihood method (REML) using the DMU package. Inbreeding coefficient was included in statistical model as a linear regression and as a fixed effect.

Average inbreeding coefficient for the entire population including all ancestral dogs was 1.50% and for the dogs included in the heritability analysis with known pneumonia status 2.47%. Estimated heritability (h2) of recurrent pneumonia in IWHs was high (h2=0.55, standard error [SE] 0.17) and it remained high when inbreeding coefficient was included as a linear regression factor (h2=0.55, SE 0.17) or as a fixed effect (h2=0.52, SE 0.18).

The results of this study indicate that recurrent pneumonia is moderately hereditary in IWHs, and selection using breeding values against recurrent pneumonia should be considered.

16.

Antimicrobial resistance in *E. coli* from finnish broiler production: indicator and pathogenic isolates

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Antimicrobial resistance (AMR) in *Escherichia coli* in Finnish broilers is monitored both on isolates from diseased flocks and in commensal indicator *E. coli* collected at slaughterhouses. In Finland, broilers are not treated with antibiotics and breeder flocks are treated only very rarely, yet antimicrobial resistance is still detected. The aim of this study was to describe the level, annual variation and population-specific differences in AMR in *E. coli* from broiler flocks.

Pathogenic *E. coli* isolates were collected between 2016 and 2024 from broiler flocks with colibacillosis (16–252 isolates/year). From 2016–2020, only breeder flock isolates were included; thereafter, also isolates from production broilers were tested. Indicator *E. coli* were studied every two years (170–184 isolates per sampling year). Antimicrobial susceptibility testing was performed using Sensititre™ panels and EUCAST epidemiological cut-off values when available.

Resistance levels varied markedly between years, but no increasing or decreasing trends were observed. Resistance was detected annually against ampicillin, tetracycline, sulfamethoxazole and trimethoprim. Among indicator *E. coli,* resistance against these antimicrobials was typically below 10%. In pathogenic isolates, resistance levels were also mostly low, but ampicillin resistance occasionally increased substantially, reaching up to >30% in some years. The highest overall resistance levels were observed for ampicillin, followed by tetracycline and sulfamethoxazole. Resistance to trimethoprim generally remained below 5%. Compared with indicator isolates, pathogenic *E. coli* showed greater variation in resistance levels and higher peak values, reflecting the impact of sporadic dissemination of individual virulent strains.

Resistance to fluoroquinolones, cefotaxime and gentamicin was rare, and no resistance was detected against other antimicrobial classes.

AMR in *E. coli* from Finnish broiler production remains low and limited to a small number of antimicrobials. These findings highlight the importance of continuous surveillance and isolate-based susceptibility testing, even in production systems with negligible antibiotic use.

17.

Surveys for antibodies against *Coxiella burnetii* in dairy cattle herds in finland indicates continuous low-level exposure

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Q fever is a zoonotic disease caused by *Coxiella burnetii*, an obligate intracellular bacterium. The disease is endemic worldwide apart from New Zealand. Domestic ruminants such as cattle, sheep and goat are the main reservoir of *C. burnetii*. The seroprevalence rates reported in cattle population by different countries vary greatly, ranging up to 84%. Of the Scandinavian countries in Denmark increasing prevalence, up to 79 %, have been reported. In Sweden, seroprevalence shows large regional differences, whereas in Norway the disease appears to be absent or at least the prevalence is very low. In Finland, antibodies against *C. burnetii* were first detected in 2008 in a bovine animal tested due to export. In the following investigations on the farm of origin other seropositive animals were found and *C. burnetii* bacteria was detected in bulk tank milk (BTM) by PCR. The aim of this study was to monitor the occurrence of *C. burnetii* antibodies in BTM of Finnish dairy herds to illustrate possible changes in prevalence.

The samples were collected as a part of Finnish national monitoring for bovine diseases in 2009, 2018 and 2025. The BTM samples from randomly selected dairy herds were tested for *C. burnetii* antibodies (ELISA). The proportion of herds tested ranged from 7-10% in different years. Apparent prevalence was calculated with Epitools.

The number of tested herds in 2009, 2018 and 2025, were 1238, 485 and 329, respectively. The apparent seroprevalence was 0.2% (0.08-0.6%, 95% CI) in 2009, 1.2% (0.6-2.7%) in 2018, and 1.2% (0.5-3.1%) in 2025.

Compared to other countries, the prevalence of *C. burnetii* antibodies in Finnish dairy herds can be considered low, and there are no indications of increasing trend. Although the current prevalence is low, continued monitoring is necessary to detect any increase in it.

18.

Molecular epidemiology of the zoonotic *Cryptosporidium parvum* in dairy calves in Finland

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Cryptosporidiosis, a diarrheal disease caused by the protozoan Cryptosporidium parvum, has increased more than fivefold in Finnish cattle herds since 2012. As part of the research project "Cryptosporidiosis – an emerging zoonosis from cattle", we conducted the epidemiological study to identify *C. parvum* subtypes in dairy farms by gp60 subtyping.

We analyzed a total of 101 calf faecal samples from 101 Finnish dairy herds, all of which were confirmed positive for *C. parvum* by real-time PCR. Of these, 76 samples were obtained from farms with clinical cryptosporidiosis between 2017 and 2020. Additionally, 25 faecal samples were obtained from dairy farms without a recent calf diarrhoea outbreak (control farms) in 2020. Sequencing of the gp60 gene was used to identify *C. parvum* subtypes.

We identified nine gp60 subtypes; seven were found on farms with clinical cryptosporidiosis and eight on control farms. The *C. parvum* subtype IIaA15G2R1 was found in 68% of samples from farms with clinical cryptosporidiosis and 40% of control farm samples, whereas the corresponding proportions for subtype IIaA13G2R1 were 17% and 20%, respectively. A more detailed analysis of the regional distribution of the subtypes in Finland will be presented in the poster.

For the most part, the same *C. parvum* gp60 subtypes were identified on dairy farms with clinical cryptosporidiosis and on control farms. The most common subtype was IIaA15G2R1, and the second most common subtype was IIaA13G2R1. Based on previous reports of human cryptosporidiosis, humans and dairy calves share the most common *C. parvum* gp60 subtypes in Finland. This suggests a potential occupational health risk of cryptosporidiosis for farm workers and veterinarians. Preliminary results of this study were also presented at the CSBSP10 and the ICOPA 2026 conferences.

19.

What Makes a Good Cow? Shared and Farm-Specific Immune Signatures of High-Performing Cows

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Milk production is influenced by the lactation stage, nutrition, health, management, and farm environment. We investigated whether whole-blood transcriptional programmes related to immune function were associated with milk production within commercial dairy farms, and whether these associations varied across farms and over time. Whole-blood RNA sequencing data (n=1212) were linked with longitudinal milk-production records. Within-farm association models, adjusted by lactation stage and age of the cow, were used to examine current milk yield and energy-corrected milk (ECM), future production change, and sensitivity of the results to adjustment for somatic cell count (SCC). Gene-level associations were summarized using curated immune and inflammatory transcriptional modules.

Higher current production was associated with a consistent innate immune and inflammatory transcriptional pattern, with the strongest signals involved neutrophil and phagocyte activity, Toll-like receptor/lipopolysaccharide response, interferon signaling, inflammatory cytokine pathways, and chemokine-mediated leukocyte recruitment. Associations were strongest and most coherent for ECM. Adjustment for log-transformed SCC changed individual effect estimates but did not remove the central immune-associated pattern, indicating that measured SCC alone did not explain these relationships.

Immune associations differed according to the production phenotype and time horizon. Several innate immune modules that were positively associated with current production showed weaker or negative associations with subsequent production change, whereas antigen-presentation and lymphocyte-related programmes became more prominent in trajectory models. The magnitude of immune-production associations also varied across farms.

These findings indicate that higher current dairy production is associated with a reproducible whole-blood immune transcriptional profile, while the strength and composition of this profile depend on production phenotype, time horizon, and farm context. This context dependence highlights the value of approaches such as EpiHerd (Antler Bio Ltd.), which integrate molecular findings with longitudinal production, health, nutrition, and farm-level information to support biologically informed interpretation and targeted intervention.

20.

Mikä tekee työstä maatiloilla turvallisempaa ja sujuvampaa? Tuotantoeläinlääkärien näkemyksiä kotieläintiloilla työskentelystä

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Veli-Matti Tuure, Työtehoseura

Kotieläintilat ovat moniammatillisia työympäristöjä, joissa työskentelee lähes kaksikymmentä eri ammattiryhmää. Näin ne täyttävät työturvallisuuslainsäädännön mukaisen yhteisen työpaikan määritelmän. Yhteisellä työpaikalla useiden eri työnantajien työntekijät toimivat samanaikaisesti tai peräkkäin. Tämän tutkimuksen tavoitteena oli tarkastella työturvallisuuden ja työterveyden johtamista, työnkulun koordinointia sekä työn sujuvuutta kotieläintiloilla myös tuotantoeläinlääkäreiden näkökulmasta. Aineisto kerättiin monimenetelmällisesti: moniammatillinen kysely (N=138, joista 17 eläinlääkäreitä) sekä viiden ammattiryhmän edustajien haastattelut (n=14, joista kolme eläinlääkäreitä) ja työnkulun havainnointi tilakäynneillä.

Tuotantoeläinlääkäreiden mukaan keskeisimmät vaarat liittyvät eläinten arvaamattomiin liikkeisiin, jotka kaikki muutkin ammattiryhmät tunnistavat merkittävimmäksi fyysiseksi vaaratekijäksi. Lisäksi avustavan henkilöstön vaihteleva osaaminen ja eläinten käsittelytaidot korostuvat turvallisuutta määrittävinä tekijöinä. Hoitoympäristön puutteet, kuten ahtaat tai huonosti toimivat rakenteet, ovat myös keskeisiä vaaratekijöitä. Inhimillisistä tekijöistä korostuivat eläinlääkäreiden osaamiseen, valppauteen ja turvallisuuteen liittyvät asenteet (riskinottotaipumus, persoonallisuus), kun taas työn organisoinnissa korostuvat ennakointi ja selkeät toimintatavat.

Työterveyden näkökulmasta merkittävimpiä altisteita ovat biologiset altisteet, erityisesti pölyt, bakteerit ja sekä kryptosporidioosia aiheuttavat alkueläimet. Fyysistä kuormitusta aiheuttavat erityisesti epäergonomiset työasennot ja toistoliikkeet, ja psykososiaalista kuormitusta lisäävät työn vaativuus, aikapaine, vastuu ja yksintyöskentely, jotka eläinlääkärit kokevat muita ammattiryhmiä kuormittavammiksi.

Haastattelut syvensivät tuloksia osoittamalla, että työn turvallisuus ja sujuvuus ovat vahvasti riippuvaisia tilakohtaisista ennakkovalmisteluista, erityisesti eläinten asianmukaisesta erottelusta ja kiinnipitämisestä. Puutteet viestinnässä, työn koordinoinnissa ja avustavassa osaamisessa heikentävät työn sujuvuutta ja lisäävät vaaratilanteita.

Tulokset osoittavat, että eläinlääkäreiden työturvallisuus riippuu merkittävästi tilan toimintatavoista, ennakkovalmisteluista ja eri toimijoiden välisestä yhteistyöstä. Turvallisuutta ja työn sujuvuutta voidaan parantaa vahvistamalla yhteistä tilannetietoisuutta, ennakoivaa viestintää, eläinten asianmukaista käsittelyä sekä eläinten kiinnipidossa avustavien henkilöiden osaamista.

Maayhteisö-hanke on EU:n osarahoittama, ja sitä rahoittavat Euroopan maaseuturahasto 2023–2027 sekä Kaakkois-Suomen elinvoimakeskus. Hanketta johtaa Luonnonvarakeskus, ja sen osatoteuttajina ovat Työtehoseura ry ja Helsingin yliopiston Ruralia-instituutti. Tutkimuksen tekijöillä ei ole ilmoitettavia eturistiriitoja. Tutkimukseen osallistuneet antoivat tietosuojan mukaisen henkilökohtaisen suostumuksen.

21.

A survey of sheepfarmers' biosecurity perceptions

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The objective of Lammaslaidun project was to gather information on specific zoonotic bacteria and parasites in Finnish sheep and sheepfarms. AIM. A survey gathered information on farmers' biosecurity perceptions. MATERIALS AND METHODS. Webropol survey and analytics tool was used. There were 1187 registered sheep farms in Finland, 2022. Information about survey and link to questionnaire was sent by email to sheep farmers as well as delivered thru social media channels. RESULTS. In total, 241 sheep farmers responded to the survey. For 50 of the 241 respondents (21%), sheep farming was their main income, a secondary income for 54 respondents and a hobby for a half of the responders (n=121/241, 50%). Average herd size in these categories was 131, 39 and 5 ewes over one year of age, respectively. Most responders (126/225=56%) had a conventional farm and 40% responded they had an organic farm, the rest 4 % did not specify. There was another farm, typically cattle or sheep farm, nearby, within 5 km, according to the majority (166/226 =73 %) of respondents. In the last 12 months, 57% of holdings had bought live animals. Respondent gave the following answers when asked who was allowed to access to the sheep on the farm.1) family members and farm own workers, 100 % of respondents. 2) Temporary help like shearer or vet, 54 %. 3) Travellers, visitors, tourists, 43 %. 4) Other professionals like neighbour farmer or slaughter truck driver, 36%. A hygiene lock was rare (40/222=18%) to find on farms CONCLUSIONS. Sheep farms are often visited, also by tourists and other guests. Most farms did not have proper hygiene lock protocols. In addition, the concept of a hygiene lock was unfamiliar to the farmers.

22.

Impact of *Lawsonia intracellularis* vaccination on tail-bites and related diseases, evaluated by antimicrobial treatments and slaughterhouse remarks in Finnish herds

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Lawsonia intracellularis (LI) causes porcine proliferative enteropathy, vaccination is common control method. Tail biting is multifactorial problem leading to secondary lesions such as abscesses, arthritis and carcass losses. Previous studies suggest that improved health, including gut health and LI-vaccination, may reduce the risk of tail-biting.

The aim of this study was to investigate whether LI-vaccination (Porcilis® Lawsonia ID vet.) impacted the prevalence of tail-bites and associated health problems using antimicrobial treatment and slaughterhouse remarks as outcome parameters in commercial Finnish pig herds.

Data from six finisher herds delivering pigs to same slaughterhouse were analyzed.

Antimicrobial treatments (four herds) and potential tail bite-related slaughterhouse remarks (tail bites, abscesses, arthritis, condemnations; six herds) were compared between two seasonally matched six-month periods before and after LI-vaccination.

Antimicrobial data was found to contain only diagnoses potentially related to tail biting. Treatments for tail bites alone increased slightly after versus before LI-vaccination (+1.9 %-points) though not reported in all herds. The overall proportion of pigs treated decreased by –2.9 %-points (range –10.7 to +2.3). Most notably, total antimicrobial consumption (ml/animal) decreased in three of four herds, averaging –29.7% (range –65.6% to +39.6%) after vaccination.

Tail bite remarks were consistently low and below 6.2% (average: 2.0%; range: 0 to +6.2) with a negligible average change (–0.02 %-points; –0.8 to +0.4). Slight increases were noted in carcass condemnations (+1.4; 0.2–3.6), abscesses (+0.2; –0.9–1.4), arthritis (+0.2; –0.6–1.0), and total remarks (+1.8; –1.0–3.8).

Antimicrobial treatments showed clear reductions in both treated animals and total antimicrobial consumption after LI-vaccination. Slaughterhouse remarks may misjudge tail biting and do not express changes in severity, as wounds can heal before slaughter or severely affected pigs may not reach the abattoir. These findings indicate that LI-vaccination may indirectly reduce stressors predisposing tail-biting, improve welfare and decrease herd-level antimicrobial usage.

Conflict of interest: Sanna Nikunen and Susanne Leth Musse are employed by MSD Animal Health, which markets vaccine used in the study.

23.

Karitsoiden sisäloistautien ehkäisy terveydenhuollon laidunnussuunnitelman avulla

Rautiainen Johanna

Lammastalouden alkutuotannon kestävyys näkyväksi -hanke, Lammasmaailma Oy

Sisäloistaudit ovat maailmanlaajuisesti tärkein lammastuotannon kannattavuutta ja laiduntavien karitsoiden hyvinvointia heikentävä tekijä. Viime vuosikymmenien kehitystä maailmalla ovat ilmentäneet kasvanut riippuvuus loislääkkeistä ja lääkkeille resistenttien loisten hälyttävä yleistyminen. Suomessa suurin merkitys on sukkulamadoilla, joista tärkeimpiä ovat *Trichostrongylidit, Teladorsagia (Ostertagia), Nematodirus* ja *Haemonchus*. Näillä loisilla on keskenään melko samankaltainen, suora elinkierto. Tavoitteellisen sisäloistorjunnan tavoite on varmistaa, että tartuntapaine nuorten eläinten käyttämillä laidunlohkoilla pysyy niin alhaisena, etteivät karitsat ripuloi eikä niiden kasvu häiriinny. Tässä tutkimuksessa seurasimme laidunnussuunnitelman (Laidunnussuunnitelma-TH) vaikutusta sisäloistartuntojen ja loislääkitysten määriin kuudella ammattilaistilalla, jotka kaikki olivat siihen mennessä joutuneet turvautumaan vuosittain uuhien ja karitsoiden lääkityksiin. Sisäloistartuntoja seurattiin edustavan papananäytteenoton avulla. Niin laidunnussuunnitelman sisältö kuin edustava näytteenotto on kuvattu hankkeessa laaditussa työohjeessa (2026). Loismunien määrä ja laji määritettiin modifioidulla McMaster-menetelmällä. Lampureiden kokemukset loistilanteen muutoksista kerättiin kyselylomakkeella kesän 2026 aikana. Muutoksia sisäloislääkkeiden käytössä selvitettiin tilojen pitämästä lääkekirjanpidosta. Tutkimukseen valitut tilat toteuttivat laidunnussuunnitelmaa hyvin, joskin kahdella tiloista laidunhygienian tavoitteita oli suunnitelmassa kevennetty. Syynä oli näiden tilojen hyvin intensiivisen laidunten käyttö. Loislääkkeiden käyttö väheni kaikilla tiloilla jo ohjelman ensimmäisenä vuonna alle puoleen. Lampureiden vastausten perusteella karitsoiden teuraskypsyys aikaistui laidunnussuunnitelmaa seuranneiden 1-3 vuoden aikana keskimäärin jopa neljä viikkoa. Löydöstemme perusteella terveydenhuollon laidunnussuunnitelma voi ehkäistä lampaiden sisäloistauteja kestävämmin ja kannattavammin kuin toistuvat lääkitykset.

Sidonnaisuudet:

Terveydenhuollon laidunnussuunnitelmat on laadittu osana Lammasmaailman palvelutuotantoa. Lammasmaailma on ollut avustuksen saajana Ruokaviraston hankepäätöksessä 2428/03.02.01.10.01/2024.

24.

Vasikoiden putkitus, eli vasikoiden linkittäminen ennalta määrätyiltä maitotiloilta sovittuihin kasvattamoihin ja sen vaikutus vasikoiden antibioottihoidon tarpeeseen

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Suomen maitotilojen välitysvasikat kuljetetaan yleensä nuorina maitotiloilta vasikkakasvattamoihin tai ternistä teuraaksi kasvattamoihin. Suomen maitotilat ovat yleensä aika pieniä, joten vasikat joudutaan keräämään monelta eri lähtötilalta ennen kuin ne saapuvat kasvattamoon. Eri lähtötiloilta tulevien vasikoiden sekoittaminen voisi olla mahdollinen riskitekijä vasikoiden hengitystietulehduksille ja sitä kautta antibiootinkäytölle. Tämän tutkimuksen tavoite oli selvittää, jos vasikoiden linkittäminen ennalta määrätyiltä maitotiloilta aina sovittuihin kasvattamoihin, eli vasikoiden putkitus, vaikuttaa vasikoiden antibioottihoidon tarpeelle.

Vasikat kuljetettiin määrätyiltä maitotiloilta (1–7 maitotilaa per kasvattamo) aina samalle kasvattamolle. Kasvattamo vastaanotti pääsääntöisesti 8–16 vasikkaa joka toinen viikko. Aineisto kerättiin kymmenestä ternistä teuraaksi-kasvattamosta Suomessa, ja se sisälsi kunkin yksikön vastaanottamat vasikat kahden vuoden ajalta vuosien 2018–2025 välillä. Interventiota edeltävän vuoden aikana kasvattamoihin kuljetetut vasikat käytettiin historiallisena kontrolliryhmänä. Vasikoita seurattiin teurastukseen saakka ja annetut antibioottihoidot kirjattiin Nasevaan.

Tilastotieteellinen analyysi tehtiin STATA/MP 18.0 ohjelmalla. P-arvoa < 0,05 pidettiin tilastollisesti merkitsevänä. Logistisella regressioanalyysilla tutkittiin vasikoiden antibioottihoidon tarpeen ja vasikoiden putkittamisen välistä yhteyttä. Kasvattamoa ja erää käytettiin satunnaistekijöinä. Rotu, sukupuoli ja kuljetuspaino otettiin analyysissä myös huomioon. Rodut jaettiin viiteen eri ryhmään: Holstein, Ayshire, isot ja suuret risteysliharodut ja muut rodut.

Yhteensä 6 558 vasikkaa sisällytettiin analyysiin. 35,3 % kontrollivasikoista ja 24,2 % tutkimusvasikoista sai antibioottihoitoa. Tilastollisen analyysin perusteella tutkimusryhmän vasikoilla oli pienempi todennäköisyys (OR=0,53, p=0,001) saada antibioottihoitoa kuin kontrolliryhmän vasikoilla. Suurempi kuljetuspaino oli yhteydessä pienempään todennäköisyyteen saada antibioottihoitoa (OR=0,97, p=0,001). Hiehoilla oli pienempi todennäköisyys (OR=0,59, p=0,001) saada antibioottihoitoa sonneihin verrattuna. Lisäksi suurten (OR=0,83, p=0,035) ja pienten risteysliharotujen (OR=0,42, p=0,001) vasikoilla oli pienempi todennäköisyys saada antibioottihoitoa kuin Holstein-rotuisilla vasikoilla.

Vasikoiden välitysjärjestelmän kehittäminen siten, että vasikat siirretään ennalta määritetyiltä maitotiloilta sovittuihin kasvattamoihin, näyttäisi vähentävän riskiä antibioottihoidolle. Tämä johtuu todennäköisesti lähtötilojen määrän vähenemisestä ja vasikoiden vähäisemmästä sekoittamisesta, joka kirjallisuuden mukaan, vähentää sekä sairastuvuutta että stressiä.

Eva-Lina Sandell työskentelee laatuvastaavana eläinlääkärinä Snellmanin Lihanjalostus Oy:ssä, muilla kirjoittajilla ei ole eturistiriitoja tutkimukseen liittyen.

25.

Herd-level factors associated with *Streptococcus uberis*, *Staphylococcus aureus*, and *Streptococcus agalactiae* mastitis: dairy herd data from 2013, 2018, and 2023

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Streptococcus uberis is an important cause of bovine mastitis, primarily transmitted via environmental pathways, while some strains show potential for contagious transmission. This retrospective observational study aimed to determine and evaluate the herd characteristics associated with 1) increased *S. uberis* proportional morbidity (PM), 2) increased *Staphylococcus aureus* PM, and 3) presence of *Streptococcus agalactiae* in a herd.

Data consisted of Finnish national dairy herd improvement records and quarter-level milk sample qPCR analyses for 2013, 2018, and 2023. *S. uberis* and *S. aureus* PM were estimated through bootstrapping, and herds were classified as having high PM if the 95% CI lower bound exceeded 19% (1 754 herds) and 22% (1 534 herds), respectively. Herds were classified as *S. agalactiae*-positive if any sample tested positive (2 726 herds).

High *S. uberis* IMI PM was associated with increasing herd size, higher herd-average parity, and an increased proportion of multiparous cows treated for mastitis. High *S. aureus* IMI PM was associated with decreasing herd size, a pipeline milking system, lower herd-average parity, and udder diseases as a common culling reason. Positive *S. agalactiae* herd-status was associated with increasing herd size, AMS milking system, and lower herd-average parity.

Compared to the two more contagious pathogens, *S. aureus* and *S. agalactiae*, high *S. uberis* PM was less related to the milking system, while increasing herd size increased the odds of having high *S. uberis* PM, which could suggest that the transmission route of *S. uberis* might have been more environmental than contagious.

26.

Veren ionisoituneen kalsiumin määritys lypsylehmän kalsiumaineenvaihdunnan häiriöiden tunnistamisessa

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Poikimisen aikaan lypsylehmän kalsiumaineenvaihdunnassa tapahtuu muutoksia ja prosessin häiriintyminen voi johtaa lehmän sairastumiseen poikimahalvaukseen. Kalsiumaineenvaihdunnan muutosten havaitsemiseen ja lehmän veren kalsiumpitoisuuden määrittämiseen ei ole ollut lypsykarjatilalla käytettäviä diagnostisia keinoja, jotka parantaisivat kalsiumaineenvaihduntahäiriöiden diagnostiikkaa. Markkinoille on tullut hiljattain navettaolosuhteissa käytettävä veren ionisoituneen kalsiumin (iCa) pitoisuutta mittaava analysaattori. Pilottitutkimuksessa tutkittiin kaupallisen LAQUAtwin Ca-11C (HORIBA Advanced Techno, Co., Ltd., Japani) analysaattorin toimintavarmuutta.

Laskimoverinäytteitä otettiin poikimahalvaukseen kliinisen oirekuvan perusteella sairastuneilta lypsylehmiltä (testiryhmä 1, n = 15) sekä lypsylehmiltä 0–7 tuotospäivää (testiryhmä 2, n = 29) ja 21–60 tuotospäivää (testiryhmä 3, n = 15). iCa-pitoisuus mitattiin tutkittavalla analysaattorilla kahdesti kokoverestä ja kolmesti plasmasta. Mittauksen jälkeen plasmanäytteet lähetettiin ulkopuoliseen laboratorioon kokonaiskalsiuminpitoisuuden verrokkimääritykseen. Tilastotieteellisillä menetelmillä tarkasteltiin 1) plasman ja kokoveren iCa sekä plasman iCa ja kokonaiskalsiuminpitoisuuksien välistä suhdetta, 2) plasman iCa pitoisuuden mittauskertojen välistä variaatiota, 3) plasman iCa keskimääräistä pitoisuutta testiryhmissä, 4) analysaattorin herkkyyttä ja tarkkuutta verrattuna kokonaiskalsiumpitoisuuteen, 5) hypokalsemian määrittämiseksi sopivaa iCa-pitoisuutta.

Testiryhmissä 1-3 plasman iCa-pitoisuus oli keskimäärin 0,84±0,30 mmol/l, 0,96±0,14 mmol/l ja 0,99±0,15 mmol/l. Keskimääräiset kokonaiskalsiumpitoisuudet testiryhmittäin olivat vastaavasti 1,67±0,55 mmol/l, 2,27±0,23 mmol/l ja 2,32±0,13 mmol/l. Kokoveren ja plasman iCa-pitoisuuksien välillä havaittiin positiivinen lineaarinen korrelaatio ($r^2 = 0,66$, $p \leq 0,001$). Plasman iCa ja kokonaiskalsiumin suhde oli keskimäärin 0,44 (±0,07). Plasmanäytteiden kolmen rinnakkaismittauksen iCa-pitoisuudet olivat samat 69,1% (38/55) näytteitä. Yhden rinnakkaismittauksen tulos erosi muista ±0,1 mmol/l 30,9% näytteitä (17/55). Plasman iCa mittausten variaatiokerroin oli 0,2. iCa-mittausten kliininen herkkyys ja tarkkuus olivat 64,3% ja 30,8% käytettäessä analysaattorivalmistajan ja ulkoisen laboratorion viitearvoja hypokalsemialle. ROC-analyysissä suurin käyränalusala 0,864 ($p \leq 0,001$, 95% luottamusväli 0,762–0,966) havaittiin käytettäessä hypokalsemian raja-arvona kokonaiskalsiumpitoisuutta 2,00 mmol/l vastaten iCa-pitoisuutta 0,98 mmol/l (herkkyys 91,7%).

Näytetyyppi ei merkittävästi vaikuttanut iCa-pitoisuuteen eivätkä saman näytteen mittaustulokset merkittävästi eronneet toisistaan tukien testattavan analysaattorin luotettavuutta ja käyttöä kenttäolosuhteissa. Analysaattorin herkkyys parani käytettäessä kokonaiskalsiumpitoisuutta 2,00 mmol/l hypokalsemian perusteena. Veren iCa-pitoisuuden <0,98 mmol/l avulla voidaan tunnistaa hypokalsemiset lehmät.

27.

Associations between the number of food control inspections and the compliance of FBOs

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In the European Union, food business operators (FBOs) are responsible for ensuring food safety and their compliance is overseen by official food control. As non-compliances have been associated with foodborne diseases, understanding the impact of number of inspections is important. The objective of this study was to determine whether there is an association between the number of inspections and FBOs' compliance level.

The material contained all food control inspection reports regarding restaurants in Finland between 2020 and 2024 (n= 22 035). Inspection reports consisted of 17 subsections that each contained several inspection items. Only subsections inspected at least 5 000 times during the study period were included. The restaurants were grouped into three groups based on the average number of inspections of restaurants in local food control units. In Finland, inspections are graded on a four-level scale (A-D), which was used to describe FBOs' level of compliance. Two-proportion z-test was used to compare CD-proportions between groups.

The analyses consisted of 14 subsections with a total of 388 037 inspection entries. At least 1.4 times more non-compliances that impair food safety or mislead consumers were detected in six subsections in the restaurants with the lowest number of inspections than in the restaurants with the highest number of inspections ($p < 0.05$). The greatest differences were observed in subsections "packaging materials and food contact materials", "traceability and recalls", "food temperature management" and "hygiene of food production or handling" with 3.9, 2.6, 1.6 and 1.6 times more grades C and D, respectively.

The findings improve understanding of how the number of inspections influence FBOs' compliance with food safety legislation. They indicate that increasing the number of inspections improves compliance. These findings support evidence-based decisions regarding how many inspections should be conducted in Finland.

28.

Persistence of murine norovirus in berry smoothies

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Human noroviruses (HuNoV), members of the *Caliciviridae* family, are a common cause of foodborne outbreaks. In smoothies, berries can be a source of HuNoV. The aim of our study was to determine the presence of murine norovirus in berry smoothies with or without milk. We used murine norovirus because HuNoV is difficult to cultivate in the laboratory.

Murine norovirus (MNV-1) and RAW 264.7 cells were employed. We used berry smoothies in our experiments, assessing various time points and temperatures (0 h-4°C, 1-2 h-4°C, 1-2 h-37°C, 2 h-50°C, 24 h-4°C, 24 h-37°C, and 24 h-50°C). The smoothies were made in a blender using blue- or raspberries, bananas, and milk, or PBS as a substitute for milk (MNV in smoothie with or without milk). As a control, MNV was added to PBS without smoothie (MNV in PBS). The TCID50 assay was used to assess the viral load.

At 4°C, MNV remained stable (6.5 $\log_{10}$ $TCID_{50}$/ml) in berry smoothies. At 37°C, MNV titre decreased by 0.8-1.4 $\log_{10}$ $TCID_{50}$/ml in all berry smoothies after 24 h. At 50°C, after 2 h, a 0.5-1.8 $\log_{10}$ decrease in MNV titre was observed in berry smoothies. At 50°C after 24 h, MNV titre in all smoothies and in PBS decreased dramatically. Some MNV positivity was detected in raspberry smoothies with milk and in PBS (4/6 and 2/6 replicates, respectively). In blueberry smoothies with milk, a low MNV titre was detected (6/6 replicates; 0.85 $\log_{10}$ $TCID_{50}$/ml). In both berry smoothies without milk, MNV remained undetectable.

Murine norovirus was shown to persist in berry smoothies at low temperatures and for up to 24 h at 50°C in milk smoothies. The data generated may be useful in estimating the food safety risks of HuNoV in smoothies. If norovirus-contaminated berries are used without heat-treatment, this could result in foodborne illnesses.

29.

Ympäristöterveydenhuolto ja sään ääri-ilmiöt – kyselytutkimus

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Suomessa kuntien tehtäviin kuuluu terveellisen elinympäristön turvaaminen. Kunnilla ja ympäristöterveyden valvontayksiköillä on velvollisuus varautua erilaisiin häiriö- ja poikkeustilanteisiin. Häiriötilanteisiin varautumista on Suomessa tutkittu vähän.

Sään ääri-ilmiöt ovat yksi muuttuvan ilmaston aiheuttamista häiriöistä, jotka ovat yleistyneet niin maailmanlaajuisesti kuin Suomessakin. Sään ääri-ilmiöt ovat vallitsevasta ilmastosta poikkeavia säätiloja. Ääri-ilmiöt voivat olla lyhyitä, suurta tuhoa aiheuttavia ilmiöitä kuten voimakas myrsky tai pitkäkestoisempia kuten kuumuuden aiheuttama kuivuus.

Tutkimme Suomen ympäristöterveydenhuollon yksiköiden ja viranhaltijoiden näkemyksiä sään ääri-ilmiöistä sekä niihin varautumista ympäristöterveydenhuollon yksiköissä. Lisäksi selvitimme kuinka tuttuja one healthin ja planetaarisen terveyden käsitteet ovat ympäristöterveydenhuollossa työskentelevien parissa. One health eli yhteinen terveys -ajattelumalli yhdistää ihmisten, eläinten ja ympäristön terveyden toisistaan riippuvaiseksi kokonaisuudeksi. Planetaarinen terveys on uudempi holistinen ajattelutapa, joka huomioi koko planeetan kestävyyden.

Teimme kyselytutkimuksen Webropol -sovelluksella, joka lähetettiin sähköpostilla Manner-Suomen 60 ympäristöterveydenhuollon valvontayksikölle. Saimme kyselyyn yhteensä 90 vastausta 37/60 (62 %) valvontayksiköstä. Vastaajat jaettiin koulutuksen perusteella kahteen eri ryhmään; eläinlääkärit ja muut ympäristöterveydenhuollon viranhaltijat. Lisäksi maakunnat jaettiin kuuteen suurempaan alueeseen maantieteellisen sijainnin ja yhteisten maantieteellisten piirteiden mukaan. Vastaukset käsiteltiin ja kuvaajat sekä taulukko luotiin Microsoft Excelillä. Avoimet kysymykset analysoitiin etsimällä vastauksista toistuvia teemoja.

Tutkimuksemme mukaan vastaajat arvioivat alueillaan yleisimmiksi sään ääri-ilmiöiden aiheuttamiksi riskeiksi pitkän hellejakson, kuivuuden ja rankkasateet. Sään ääri-ilmiöihin oli aineiston mukaan osattu varautua jonkin verran. Saatujen vastausten perusteella kaikki valvontayksiköissä työskentelevät eivät ole tietoisia varautumissuunnitelman olemassaolosta, sisällöstä tai suunnitelmaan pääsystä. Tutkimuksemme mukaan 88 % vastaajista piti ympäristöterveydenhuollon vaikutusvaltaa ilmastonmuutoksen torjunnassa melko vähäisenä tai ei lainkaan merkittävänä. One health oli eläinlääkäreille tuttu käsite, mutta muut ympäristöterveydenhuollon viranhaltijat tunnistivat huonosti one healthin sisällön. Sen sijaan planetaarinen terveys oli myös muille viranhaltijoille tutumpi käsite.

Ilmastonmuutoksen aiheuttamia muutoksia olisi syytä pohtia kuntatasolla ja ympäristöterveydenhuollossa enemmän. Sään ääri-ilmiöt ovat vain yksi ilmastonmuutoksen kiihdyttämistä muutoksista ja niiden alueellista tunnistamista ja varautumista on lisättävä ympäristöterveydenhuollossa. Kaikkien ympäristöterveydenhuollossa toimivien ammattikuntien osallistumista yhteisen terveyden edistämiseen tulisi lisätä.

30.

Meat inspection of wild game in Finland in 2020–2024

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Data on meat inspection results of wild game is scarce. Number of meat inspections, total and partial condemnations are collected and published by Finnish Food Authority (FFA). Species specific data are collected from moose (*Alces alces*), bear (*Ursus arctos*) and wild boar (*Sus scrofa*), whereas data from other cervids and other species is aggregated. The hunting bag statistics are collected and published by National Resources Institute Finland (Luke).

In 2020–2024, 622 000 large wild game animals were hunted; 199 000 (32%) moose and 416 000 (67%) other cervids. The most hunted cervid was white-tailed deer (*Odocoileus virginianus*). In addition, ca. 5 700 wild boar and 1 100 bears were hunted.

Only a small proportion of wild game is meat inspected. Most of the meat is consumed by the hunters and their families. However, hunters and hunting clubs can sell small amounts of small wild game and wild cervids, as well as small amounts of wild game meat, directly to consumers. Species susceptible to trichinella, such as wild boars and bears must be tested negative for trichinella if sold to consumers. Hunters and hunting clubs can also sell small amounts of meat from small wild game and wild cervids to local retail without meat inspection. No data is available on the quantity of carcasses and game meat sold without meat inspection.

In 2020–2024, ca. 12 300 animals were meat inspected of which 800 (7%) were moose, 10 600 (86%) other cervids, 180 (1%) bears, 7 (0.06%) wild boar and 700 (6%) other animals. 0% (wild boar) to 2.2% (bear) carcasses were totally and 0% (wild boar) to 36% (other animals) were partially condemned. The condemnation causes are not collected by the FFA. More detailed collected data would be needed to understand variation in the condemnations.

31.

Prevalence of *Clostridium botulinum* in food raw materials and products available on the Finnish market

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Clostridium botulinum spores are ubiquitous in the environment and may contaminate food raw materials. Under favorable anaerobic conditions, the spores can germinate and outgrow into toxinogenic cultures that produce the highly potent botulinum neurotoxin (BoNT), a causative agent of a potentially life-threatening intoxication, botulism. Vacuum-packaged, refrigerated processed foods of extended durability are of particular concern, as *C. botulinum* Group II spores can survive mild heat treatments and grow and produce BoNT during storage at chill temperatures, making stringent risk assessment and management a necessity. As current risk management relies largely on harsh heat treatments that challenge product quality and sustainability, knowledge of *C. botulinum* prevalence in raw materials is essential for optimizing food safety control measures.

We examined a total of 1037 samples from various food categories for the prevalence of *C. botulinum* Groups I and II. We studied raw materials commonly used in the food industry, including meats (pork, poultry), vegetables (carrots, onion), spices (black pepper, parsley, basil, carrot, celery, onion), and salt. Additionally, we studied meat alternatives such as vegetarian sausages and vegetarian cold cuts. Food category-optimized enrichment protocols combined with real-time PCR targeting the botulinum neurotoxin gene were applied to detect *C. botulinum* Groups I and II.

We observed a very low prevalence (0.1%) of *C. botulinum*, with only one dried parsley sample detected as PCR-positive. We successfully isolated and phenotypically and genomically characterized a *C. botulinum* Group II strain carrying the neurotoxin subtype B4 gene. In conclusion, our findings indicate that although the prevalence of *C. botulinum* appears very low in food raw materials and products available on the Finnish market, sporadic spore contamination can occur. This represents a non-negligible risk that must be taken into account when assessing food safety and developing control measures, particularly for minimally processed foods.

32.

Slaughterhouse wastewater shows potential for AMR surveillance by reflecting pig-associated AmpC-producing *Escherichia coli*

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Wastewater-based surveillance has shown potential for monitoring antimicrobial resistance (AMR) in humans, but its feasibility to animal AMR surveillance remains poorly investigated. Slaughterhouse wastewater could serve as pooled microbial sample of processed animals and complement existing surveillance programs cost-effectively. This study evaluated whether slaughterhouse wastewater contains AmpC- and Extended-Spectrum (ESBL) β-lactamase-producing *Escherichia coli* (AE-EC) similar to those in slaughter pigs.

Wastewater samples (n=32) were collected at a large-scale pig slaughterhouse over 12 months. During two sampling events, cecal content of 121 slaughter pigs were collected and pooled by slaughter batch (n=9). AE-EC were isolated and characterized pheno- and genotypically. A subset underwent whole-genome sequencing (WGS) with Illumina Novaseq and bioinformatic analysis, including core-genome multilocus sequence typing (cgMLST) (Bruker MBioSEQ Ridom Typer 12.0.0).

AE-EC was detected in 30/32 wastewater samples (94%) and in 6/9 slaughter batches (67%). Of the 55 sequenced isolates, 53 grouped into three cgMLST clusters, all of which contained isolates originating from both slaughter pigs and wastewater. *E. coli* ST88 serotype O34:H9 was detected in 27/30 (90%) positive wastewater samples, and in 2/6 (33%) positive pig slaughter batches. ST131 was the second most common *E. coli* type, detected in 3/6 (50%) positive pig slaughter batches and 2/30 (6.7%) wastewater samples.

AmpC promoter point mutation C-42T was found in 47/55 isolates (85%), and T-32A in 7/55 (13%). Only one isolate (1.8%) carried an ESBL-gene $bla_{CTX\text{-}M\text{-}15}$.

E. coli ST88 O34:H9 predominated in wastewater and was also detected in slaughter batches, suggesting repeated introduction to wastewater from pigs. Although ST131 was found in half of the positive batches, it was recovered from wastewater only twice, highlighting the need for developing sampling and isolation strategies. Despite these limitations, slaughterhouse wastewater consistently captured AmpC-producing *E. coli* lineages detected in slaughter pigs and shows promise as a complementary tool for animal AMR surveillance.

33.

Short-term survival comparison of murine norovirus and simian rotavirus in fruit juices and milk

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Foodborne viruses can persist in beverages, which affects transmission risk. However, harmonized infectivity-based comparisons across different beverage matrices remain limited. This study investigated the short-term survival of murine norovirus (MNV-1) and simian rhesus rotavirus (RRV) in blueberry juice, pineapple juice, and milk stored at 4°C and 25°C for 14 days.

Commercial beverages were inoculated (50-fold dilution) with each virus and sampled on days 0, 1, 2, 3, 5, 7, and 14. MNV infectivity was quantified by $TCID_{50}$ assay (RAW 264.7 cells), and RRV by plaque assay (MA-104 cells). Viral titers were expressed as $\log_{10}$ $TCID_{50}$/mL or log10 PFU/mL. All experiments were performed in a triplicate.

The beverages differed markedly in pH. Milk was near neutral (pH 6.7~6.8 at both temperatures), whereas blueberry juice was highly acidic (pH~3.2) and pineapple juice moderately acidic (pH~3.5). pH values remained stable throughout storage.

Initial viral titers were ~5–6 $\log_{10}$ infectious units/mL. In fruit juices, both viruses showed rapid, temperature-dependent inactivation at 25°C. In blueberry juice, MNV declined by 4.2 $\log_{10}$ within 5 days at 25°C, and RRV became undetectable by day 5. Pineapple juice showed a similar but slightly less pronounced reduction. At 4°C, viral reduction rates in juices were slower, with partial persistence observed through day 14.

In contrast, milk supported viral stability. At 4°C, both viruses showed <0.5 $\log_{10}$ reduction over 14 days. Even at 25°C, only moderate reductions were observed.

These results demonstrate that viral persistence in beverages is strongly matrix- and temperature-dependent, with low pH accelerating inactivation, particularly at room temperature. The harmonized infectivity-based approach enables reliable survival comparisons across beverage matrices and supports improved quantitative microbial risk assessment for fruit-based beverages.

34.

Vatinoxan increased early cutaneous microcirculation in standing horses sedated with intravenous detomidine

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Many clinical conditions affect cutaneous microcirculation in horses, yet its measurement remains challenging. The Enhanced Perfusion and Oxygen Saturation (EPOS) technology combines laser Doppler flowmetry (LDF) and diffuse reflectance spectroscopy (DRS) for real-time transcutaneous assessment of microcirculation and tissue oxygenation. We aimed to determine if EPOS could detect detomidine-induced changes in cutaneous microcirculation and if vatinoxan (a peripheral alpha2-adrenoceptor antagonist) would influence these effects. We hypothesized that detomidine would reduce microcirculation, vatinoxan would mitigate this effect, and both LDF and DRS would detect these changes.

Eight horses received two intravenous treatments in a randomized order: detomidine 0.02 mg/kg (D) and detomidine 0.02 mg/kg with vatinoxan 0.2 mg/kg (DV). The EPOS probe was attached to the lateral surface of mid-antebrachium and the collected data averaged into 10 min periods prior to and until 60 min after treatment administration. Heart rates (HR) were also recorded. Data were analyzed with Holm-Bonferroni corrected Wilcoxon Rank Sum and t-tests.

HR decreased significantly after both treatments. The median (range) LDF, measured in perfusion units (PU), was significantly ($p = 0.048$) higher after DV (249 [100-846] PU) compared with D (98 [36-179] PU) during the first 10-minute post-treatment period. All DRS data were disregarded due to inconsistent signal recovery.

The addition of vatinoxan increased early cutaneous microcirculation in horses treated with detomidine and this difference was detected with LDF. While LDF shows clinical potential for real-time assessment of cutaneous microcirculation in horses, additional studies are needed to differentiate between normal and impaired microcirculation.

35.

Changes in serum cortisol and adiponectin concentrations during estrous cycles in healthy mares

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Practitioners sometimes encounter claims that mares are more prone to endocrinopathic laminitis, particularly during estrus. Therefore, the hypothesis was that serum total adiponectin (TAC) and basal cortisol concentrations (possibly linked to laminitis) vary depending on the estrous cycle phase.

Serum for basal cortisol concentration and TAC was collected from 11 mares and four geldings nine times at one-week intervals during spring 2024. The estrous cycle was monitored on the same days using rectal examination and ultrasonography and categorized as estrus (follicles >25 mm and endometrial edema) or diestrus (corpus luteum, no endometrial edema). TAC was determined by turbidimetric immunoassay (Immuno Diagnostics Limited), and serum cortisol by chemiluminescent immunoassay (Immulite 2000 XPi).

The median TAC of the mares in estrus and diestrus was 5.46 (min-max 4.1-13.0) and 5.60 (min-max 3.9-16.43) µg/mL, respectively, and there was no difference between the phases (p=0.82). The median cortisol concentration in estrus and diestrus was 2.50 (min-max 1.99-2.93) and 2.83 (min-max 1.98-4.80) µg/dL, respectively, and there was no difference between the phases (p=0.07). The median TAC of the geldings was 3.95 (min-max 3.13-5.00) µg/mL; mares had significantly higher TAC in both estrous cycle phases than geldings (p=0.03). The median cortisol concentration of the geldings was 2.19 (min-max 1.63-2.62) µg/dL. Mares had higher cortisol concentration than geldings during the diestrus (p=0.03), but not during the estrus (p=0.28).

The estrous cycle phase was not associated with changes in TAC or serum basal cortisol concentration in this population. Therefore, estrus may not predispose mares to laminitis. Mares had higher TAC than geldings during both estrus and diestrus and higher cortisol concentration during diestrus; however, clinically these changes were minor, which makes their significance debatable. Additionally, reasonably long freezing time of the serum samples may have affected the results; however, the duration of freezing was similar for all samples.

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36.

Detection of equine parapoxvirus in the stable environment during pastern dermatitis outbreak in Finland

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Equine parapoxvirus (EqPPV) has emerged as a cause of recurring pastern dermatitis outbreaks in horses in Finland. First detected in 2013, EqPPV has since been associated with potentially hundreds of clinical cases and suspected zoonotic transmission. Serological data and field reports suggest EqPPV outbreaks recur in Finland every few years. This study investigated the environmental presence and plausible transmission dynamics of the virus to prepare for future outbreaks and give targeted guidelines to stable staff and veterinarians.

After a large-scale EqPPV outbreak affecting hundreds of horses during winter in Finland 2021-2022, PCR diagnostics was carried out whenever EqPPV was suspected to monitor the situation (25 trotting horses from 20 stables between April 2022 and May 2025). After a period with no detected cases from April 2022 to January 2025, a new outbreak emerged in early 2025. Between February and May 2025, 8/10 of Finnish trotting stables submitting diagnostic equine samples, tested positive for EqPPV DNA. Environmental samples (n = 161) were collected from six case stables and two control stables from surfaces in direct or indirect contact with horses. EqPPV DNA was detected on grooming tools, stall infrastructure, bedding, materials handled by humans, and hands of humans, suggesting multiple possible indirect transmission routes. Notably, 83.3% (5/6) of the tested case stables had EqPPV PCR-positive environmental samples and 17.4% (24/138) of all environmental samples tested positive.

These findings confirm a recent EqPPV outbreak in Finnish trotting stables and demonstrate widespread environmental contamination during active infection. Detection of EqPPV DNA on common equipment and spaces, and on personnel shows an extensive environmental distribution during the outbreak. Overall, these findings underscore the high potential for reoccurring outbreaks and the importance of continued surveillance and early implementation of hygiene and preventative practices to minimize the effect of future outbreaks.

37.

Forensic animal welfare cases in veterinary pathology in Finland, 2013–2023

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Introduction: Forensic veterinary science is a developing, multidisciplinary field. In Finland, forensic veterinary pathology examinations are conducted by the Finnish Food Authority (FFA). We describe the animal welfare-related forensic cases of selected diagnosis groups examined at the FFA during 2013–2023 and investigate the associations between case numbers and geographical or population-related factors.

Material and Methods: Forensic autopsy cases submitted to the FFA between 2013 and 2023 were retrieved from electronic records. Cases representing the most common animal welfare-related diagnostic groups (starvation, trauma, dental disorders) were included. Species, breed, diagnosis group, and individual diagnoses were collected. Municipal population data were obtained from Statistic Finland. Chi-square tests and Spearman correlations were applied ($p<0.05$). Case numbers were visualized relative to municipal population size.

Results: Of 995 forensic cases, 353 involved diagnoses related to starvation, trauma, or dental disorders. Dogs and cats accounted for 263 cases, while 90 cases involved other companion or production animals. Among dogs and cats, no significant differences were observed between diagnosis groups. Compared with dogs and cats, other species had significantly fewer cases with dental disorders. Case numbers correlated positively with municipal population size and the proportion of rental and urban housing. No correlation was observed with the proportion of residents of foreign nationality.

Conclusions: This is the first description of Finnish forensic animal welfare case autopsies. Differences in examination protocol between species may have influenced the detection of dental disorders. Greater case numbers in densely populated areas may reflect increased recognition and reporting of animal welfare concerns.

38.

Eläinten fysioterapian rakenteinen kirjaaminen Helsingin Yliopistollisessa eläinsairaalassa

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Ihmisten fysioterapian rakenteinen kirjaaminen perustuu ICF-luokitukseen ja Fysioterapianimikkeistöön. Eläinten fysioterapiassa vastaavia luokituksia ei tiettävästi ole käytössä Suomessa tai ulkomailla. Tässä tutki-muksellisessa kehittämistyössä luotiin rakenteisen kirjaamisen malli Helsingin Yliopistollisen eläinsairaalan fysioterapeuttien käyttöön. Tavoite oli yhtenäistää kirjaamista ja palautekäytäntöjä, kehittää kirjaamisen laa-tua, tehostaa ajankäyttöä ja selkeyttää potilaskirjanpitoa.

YAMK-opinnäytetyö toteutettiin tutkimuksellisena kehittämistyönä soveltavan toimintatutkimuksen mene-telmin huhti-kesäkuussa 2026. Työhön osallistui eläinten fysioterapeutteja, eläinlääkäreitä ja eläintenhoita-jia. Kartoituskyselyllä selvitettiin fysioterapian kirjaamisen tärkeimpiä teemoja. Moniammatillinen kehittämi-nen jatkui innopajatyöskentelynä. Kartoituskyselyn ja innopajatyöskentelyn tulosten perusteella luotiin kirjaamisen mallin luonnos eli kirjaamispohjat. Oppimiskahvilassa fysioterapeutit muokkasivat kirjaamispohjat eri potilasryhmille. Mallia pilotoitiin kuusi viikkoa ja se viimeisteltiin loppukyselyn perusteella.

Moniammatillisen työskentelyn aikana tunnistettiin kirjaamisen haasteita ja pohdittiin niihin ratkaisuja. Yh-teiskehittämisen tuloksena valmistui eläinten fysioterapian rakenteisen kirjaamisen malli eri potilasryhmille. Malli sisältää kirjaamispohjat ortopedisen ja neurologisen potilaan, sekä osastopotilaan fysioterapiakäyn-neille. Malli otetaan käyttöön eläinsairaalla syksyn 2026 aikana.

Työn tulosten perusteella kirjaamisen tärkeimmät osa-alueet selkiytyivät, ja kirjaamisessa voidaan huomi-oida moniammatillisuus ja eri ammattiryhmien tarpeet. Rakenteisen kirjaamisen mallin käyttö yhtenäistää fysioterapeuttien kirjaamista ja selkeyttää potilaskirjanpitoa.

39.

Sattumaa vai suunnitelma? Valvontaeläinlääkäreiden urasiirtymät ja työssä pysymiseen liittyvät tekijät

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Eläinlääkäreiden hakeutumisesta valvontaeläinlääkärin työuralle sekä valvontatyön veto- ja pitovoimatekijöistä on niukasti tutkimustietoa. Tämän tutkimuksen tavoitteena oli selvittää valvontaeläinlääkärien urasiirtymiä sekä valvontatyöhön hakeutumiseen ja työssä pysymiseen liittyviä tekijöitä. Maaliskuussa 2026 toteutettuun kyselytutkimukseen vastasi 84 nykyistä tai entistä valvontaeläinlääkäriä. Verkkokyselyllä selvitettiin valvontatyöhön hakeutumista, työssä jatkamista sekä niihin liittyviä kokemuksia suljettujen ja avointen kysymysten avulla.

Valvontaeläinlääkäriksi hakeuduttiin eri uravaiheissa ja 74 % vastaajista oli siirtynyt valvontaeläinlääkärin tehtäviin praktiikasta. Siirtymä kuvattiin useimmiten ulkoisten tekijöiden ohjaamaksi (40 %), kun taas 31 % koki siirtymänsä olleen sekä omien valintojen että ulkoisten tekijöiden seurausta. Aktiivisesti valvontatehtävään hakeutuneita oli 24 %. Valvontatyön veto- ja pitovoimatekijät olivat suurelta osin samat. Tärkeimpiä tekijöitä olivat työaika ilman päivystysvelvollisuutta, mahdollisuus vaikuttaa eläinten hyvinvointiin, kiinnostava työn sisältö sekä työn sopivuus elämäntilanteeseen. Lisäksi vakituisen viran merkitys korostui työn pitovoimatekijänä.

Avovastauksissa urasiirtymät näyttäytyivät monimuotoisina. Valvontatyöhön hakeutumiseen vaikuttivat kiinnostus työn sisältöön, tarjoutuneet työmahdollisuudet, ennakoitavat työajat ja toimeentulo sekä henkilökohtaiset syyt, jotka työnsivät pois praktiikasta. Työssä jatkamista tukivat kokemus työn vaikuttavuudesta ja merkityksellisyydestä. Parityöskentely ja työyhteisön tuki kuvattiin tärkeiksi voimavaroiksi erityisesti työn kuormittavuuden hallinnassa. Aiempi praktiikkakokemus koettiin usein valvontatyötä tukevaksi.

Tulosten perusteella valvontaeläinlääkärin työ näyttäytyy vaihtoehtona praktiikalle mutta myös omana urasuuntana, jonka vetovoima perustuu työn sisältöön, koettuun merkityksellisyyteen sekä työaikojen ja ansioiden ennakoitavuuteen. Työssä pysymistä tukevat erityisesti työyhteisöön liittyvät voimavarat, kuten parityöskentely ja kollegiaalinen tuki.

40.

Farmers' Negative Emotions as a Component of the Administrative Burden of Farm Supervision

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Administrative burden often refers to additional work farmers must carry out for purposes other than their own operations. Such tasks include notification and reporting obligations, permit procedures and support applications. Psychological stress, which includes fear and other negative emotions, is also a component of administrative burden. The aim of this qualitative study was to explore farmer's perceptions on animal welfare supervision and animal-related subsidies.

The research data were collected through semi-structured interviews with twelve voluntary Finnish cattle and sheep farmers between September and December 2024. Anonymised interview summaries were analysed using inductive thematic analysis. Interview expressions were reduced into condensed codes, which were grouped into categories and subsequently organised into broader themes using ATLAS.ti software.

The interviews revealed a wide range of negative emotions including stress, fear, a sense of injustice, tension, strain, uncertainty and external pressure. Uncertainty regarding the interpretation of rules and obligations underlay many of the negative emotions reported by participants. Understanding emerged as a counterbalancing emotion. Factors identified as having the potential to mitigate psychological strain included familiarity with the inspectors, farmer involvement in policy design, farmer education, clear legal rules, and recognition of the long-term perspective of agricultural work.

Reducing the administrative burden associated with animal welfare controls and agricultural subsidies requires clear and comprehensible regulation, effective communication between authorities and farmers, and the active involvement of farmers in policy development. Particular attention should be paid toreducing uncertainty regarding the interpretation of rules and to increasing mutual understanding between farmers and authorities.

Stress and the risk for burnout can also threaten animal welfare on farms. Sustainable farming must therefore encompass farmer well-being. The psychological dimension of administrative burden should be considered when assessing administrative burden and designing new policies and regulatory measures.

The author has no conflicts of interest to declare.

41.

Development of marketing authorisations for poultry vaccines in Finland 2020-2026 / More marketing authorisations, more vaccines? Poultry vaccines in Finland 2020-2026

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This work was conducted during an internship at the Finnish Medicines Agency (Fimea).

The aim of this study was to examine the development of poultry vaccine marketing authorisations (MAs) in Finland between 2020 and 2026 and to evaluate how MAs reflect vaccine availability. Data were collected from the Finnish medicines database Saga on 16 June 2026. The analysis included all poultry vaccines with a valid MA in Finland for at least one day during the study period. The number of MAs, vaccine availability and indications were analysed.

The number of authorised poultry vaccines increased from 39 in 2020 to 62 in 2026. During the study period, 37 new MAs were granted, with the most pronounced growth occurring in 2024–2025. A total of 70 poultry vaccines held a MA during the review period, but only 15 of them were on the Finnish market at the time of data collection. Thirty-seven percent of authorised vaccines contained components targeting diseases that are restricted in Finland due to the country's disease-free status. Most newly authorised poultry vaccines were approved through the Centralised Procedure, resulting in authorisations valid throughout the EU and EEA. Many of these products were combination vaccines containing components targeting Newcastle disease, Salmonella or avian influenza, which are restricted in Finland.

Despite the substantial increase in MAs, the range of vaccines available for practical use in Finland did not increase to a comparable extent. Some critical indications remain vulnerable to supply disruptions due to limited availability. For example, only a single authorised vaccine is available for avian encephalomyelitis, while vaccines against Marek’s disease remain dependent on special permit arrangements. In addition, the increasing replacement of monovalent vaccines by combination vaccines may limit future vaccination options if suitable alternatives are unavailable. These findings suggest that the number of marketing authorisations alone does not accurately reflect vaccine availability or use in Finland.

42.

Hyvinvoiva koira autossa

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Kliinisen tuotantoeläinlääketieteen osasto, Eläinten pidon ja hyvinvoinnin oppiaine

Sääntely, ohjeet ja tieto ei-kaupallisista eläinten kuljetuksista, jotka eivät kuulu Neuvoston asetuksen eläinten suojelusta kuljetuksen ja siihen liittyvien toimenpiteiden aikana (EY N:o 1/2005) piiriin, ovat niukkoja.

Tämä kirjallisuuskatsaus selvitti koirien turvallisuutta ja hyvinvointia ei-kaupallisessa autokuljetuksessa, keskittyen lainsäädäntöön, eläimen ja sen ympäristön turvallisuuteen sekä stressiin matkan aikana. Kirjallisuuskatsauksen pohjalta laadimme oppaan koiran turvallisesta kuljettamisesta.

Koiran autokuljetuksen merkittävin turvallisuusriski on koiran kytkemättä jättäminen. Kytkemätön koira häiritsee kuljettajaa ja on törmäystilanteessa vaarassa loukkaantua sekä vahingoittaa muita autossa matkustavia. Turvallisin paikka koiralle on takapenkki tai avoimessa tavaratilassa auton rakenteisiin kiinnitetty oikean kokoinen kuljetushäkki.

Kytkemiseen käytettävän turvavälineen valinta on haastavaa, sillä turvavälineille ei ole olemassa turvallisuusstandardia. Laki ei edellytä lemmikkituotteilta kolaritestausta, mutta osa tuotteiden valmistajista testaa itse tuotteitaan. Kolaritestaus merkintä ei kuitenkaan kerro, suojaako tuote koiraa kolaritilanteessa. Tyypillisesti koiran turvavyö ei riitä onnettomuustilanteessa suojelemaan koiraa vammoilta, vaan pitää ainoastaan koiran omalla paikallaan.

Kuljetuksen aikana eläin altistuu useille hallitsemattomille stressitekijöille kuten äänille, liikkeelle, tuntemattomalle ympäristölle sekä mahdollisesti epäsopivan lämpötilan aiheuttamalle epämukavuudelle. Koira voi ilmentää stressiä esimerkiksi levottomalla käytöksellä, haukkumalla, vinkumalla, läähättämällä, kuolaamalla, kiihtymisellä tai ikkunoita vasten hyppimällä. Koiran oksentaminen autossa voi aiheutua myös pelosta ja stressistä, omistajilla saattaa olla vaikeuksia erottaa stressiä ja muita tekijöitä, kuten matkapahoinvointia toisistaan.

Kuljetuksen aikaista stressiä voidaan lieventää totuttamalla koira koulutuksen avulla autoon ja turvavälineisiin jo pennusta lähtien. Lisäksi apuna voidaan käyttää farmakologisia yhdisteitä ja feromoneja.

Koirien kuljetukseen tarkoitetuille turvavälineille tulisi määrittää kolaritesti- ja turvastandardi, jotta turvavälineiden merkinnät ovat käyttäjälle selkeitä, helppolukuisia ja luotettavia.

Oppaan laatimista rahoitti Lähitapiola Uusimaa.

43.

External Quality Assessment (EQA) for Veterinary Clinical Chemistry: Experiences from a Multinational Pilot Study

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Reliable laboratory results are essential for diagnosis, treatment decisions and patient monitoring in veterinary medicine. In-clinic analysers are used daily, but results may vary between instruments, methods and peer groups. External quality assessment (EQA) independently verifies analytical performance, detects clinically relevant bias and strengthens confidence in results used for animal care. This pilot study evaluated the feasibility, value and participant experience of a new veterinary clinical chemistry EQA scheme.

A pilot study (8531 Veterinary EQA) was organised in 2025 by EQA provider Labquality, Finland, in cooperation with SLU, Sweden. Two pooled animal serum samples, cat and dog serum, were distributed to veterinary clinics and laboratories. Participants analysed the samples with their routine chemistry analysers and submitted results online. Results were evaluated in method-specific peer groups.

42 participants from six countries took part. Results were submitted from several analyser platforms, including veterinary-specific and conventional chemistry systems. Agreement within method groups was generally good for several measurands e.g. albumin, glucose, calcium, and sodium. However, platform-related differences were observed for some measurands including e.g. fructosamine and serum amyloid A. These findings show why clinics should not rely only on internal controls. EQA shows whether patient results are comparable within and between methods and whether method-related differences may affect interpretation. 25/42 participants responded to the feedback survey with positive comments, and all wanted to participate in future rounds.

The pilot study demonstrated a demand for veterinary-specific EQA and confirmed its practical value for routine clinical work. Participation helps clinics verify analyser performance under real conditions using animal serum samples and strengthen quality assurance. For veterinary staff, this provides confidence that laboratory results used to diagnose and monitor patients are reliable, comparable and fit for clinical decision-making. Continued veterinary EQA programmes can support harmonisation and improve the quality of veterinary laboratory testing.

44.

Serial-passage evaluation of resistance development to Norway spruce (Picea abies) resin in clinically important wound bacteria

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Antimicrobial resistance narrows treatment options for infected wounds in human and veterinary medicine, driving interest in antimicrobials with lower selective pressure than conventional antibiotics. Norway spruce (*Picea abies*) resin has been used in Northern European wound care for centuries and shows broad antimicrobial activity, but its potential to select for reduced susceptibility is unknown. The aim was to evaluate *in vitro* whether prolonged sub-inhibitory exposure to purified spruce resin reduces bacterial susceptibility.

A 20-day serial-passage study was conducted with *Pseudomonas aeruginosa* ATCC 9027, *Staphylococcus aureus* ATCC 6538 and *Enterococcus faecalis* ATCC 19433. Spruce resin from sustainably managed Finnish forests was solubilised in ethanol and serially diluted in Mueller-Hinton broth (10.0-0.156%). Cultures were transferred daily into fresh medium containing resin at sub-inhibitory concentrations (0.25-0.5x MIC). Minimum inhibitory concentrations (MIC) were determined in duplicate by broth microdilution (CLSI M07-A9) at baseline, day 10 and day 20. Resistance was predefined as a fourfold or greater MIC increase. Ethanol vehicle and product-free validation passages were included.

Baseline MICs were 5.0% (*P. aeruginosa*), 1.25% (*S. aureus*) and 2.5% (*E. faecalis*), identifying *S. aureus* as the most susceptible organism. After 20 passages the MICs were 10.0%, 2.5% and 2.5%, at most a twofold change, with *E. faecalis* unchanged throughout. No organism reached the predefined fourfold threshold. Vehicle-control and validation arms remained stable, and the day-20 increase in *P. aeruginosa* was not mirrored in them, excluding medium transfer or solvent bias.

Purified Norway spruce resin retained its antibacterial activity across 20 days of repeated sub-inhibitory exposure, with a low short-term tendency to select for reduced susceptibility. This is consistent with the non-specific action of its resin acids, lignans and p-coumaric acid on the bacterial cell wall and membrane, and supports further evaluation of spruce resin as a natural antimicrobial for wound care.

Conflicts of interest: KY and MG are employed by Repolar Pharmaceuticals Ltd., which manufactures spruce resin-based products. SP was employed by Repolar Pharmaceuticals Ltd. at the time the study was conducted. EM declares no conflicts of interest.