

## Selected Abstracts From the Literature

**Safety and immunogenicity of a novel psittacine beak and feather disease vaccine and optimisation of a thermostable spray-dried formulation.** Das T, Nath BK, Dhar PK, et al. *Vaccine*. 2026;69:127989.

Infectious diseases continue to pose a challenge for threatened species. In Australia, the circovirus associated with psittacine beak and feather disease is a threat to wild and captive parrot populations and has been listed as a key threatening process to endangered psittacine bird species. Historically, our primary method of managing viral infections in animals (and humans) is through vaccines. The goal for these researchers was to develop a realistic delivery system for immunologically naïve nestling and fledgling birds to provide them an opportunity to develop immunity against high environmental loads of wild-type infections. Many experimental vaccines rely on parenteral routes of administration; however, these are not well suited to large-scale deployment. Because of this limitation, the authors of this study explored a novel spray-dried subunit vaccine aimed at improving thermostability, shelf-life, and delivery via the mucosa. A design of experiment approach was used for this study, producing protein macroparticles that were 3.1–9.5 µm; this was considered ideal for phagocytic uptake by antigen-presenting cells. The spray-dried vaccine formulation maintained the residual moisture content, protein stability under thermal stress, and antigenicity over 12 months at room temperature. A chicken model was used to evaluate the vaccine in an in vivo model. Seroconversion was strong when administered via the intramuscular route but not via mucosal administration. However, the responses detected in individual birds identified important baseline results that could be improved. This study provided the first steps to developing a spray-dried psittacine beak and feather disease vaccine that can be used to protect psittacine birds from this deadly disease.

**Microsporidia keratoconjunctivitis identified as an emerging zoonotic threat from pet parrots: clinical and metagenomic next-generation sequencing evidence.** Sun Z, Zhang P, Li Y, et al. *Virulence*. 2026;17:2605385.

Microsporidia were once considered a parasite; however, they are now correctly identified as a primitive fungus. These opportunistic, obligate intracellular fungi can cause systemic disease in a variety of species.

While systemic infections can be nonspecific and challenging to identify, 1 site consistently observed as a site of infection that can be identified at the physical examination is keratoconjunctivitis (KCS; eg, humans, birds, and reptiles). While microsporidia KCS is indistinguishable from other etiologies on clinical examination, it can be confirmed through biopsy, scrapings, cytology, and molecular methods. The epidemiology of microsporidia is poorly defined and remains unknown for many species but can present zoonotic concerns (eg, *Encephalitozoon cuniculi*). In this study, a total of 15 confirmed human cases of microsporidia KCS were identified at Peking University Third Hospital between September 2024 and October 2025. Confirmation of the infections were made using Giemsa-stained corneal scrapings and/or metagenomic next-generation sequencing (mNGS). Among these 15 patients, 13 were confirmed as *Encephalitozoon hellem* by mNGS. All affected patients reported a history of parrot exposure, including direct ocular contact (n = 3) and indirect contact (n = 12). Only 6 patients reported abnormal clinical signs in their parrots, including ocular abnormalities and diarrhea. Two patients stated that their parrots died prior to their clinical presentation. Ocular and fecal samples from 3 parrots associated with 4 patients were collected and confirmed as shedding *E. hellem* by mNGS. Based on these results, this fungus should be considered an emerging zoonotic threat and medical doctors and veterinarians made aware of these risks to better educate individuals caring for psittacine birds.

**Evaluation of intraosseous excretory urography using iodixanol for renal imaging in budgerigars (*Melopsittacus undulatus*).** Zeinali H, Mirshahi A, Nakhaee P, et al. *Vet Med Sci*. 2026;12:e70750.

Renal neoplasia is a top differential for a budgerigar (*Melopsittacus undulatus*) that is presented with unilateral leg paresis. However, confirming a diagnosis can be challenging because of the small size of these birds. While radiography is commonly used, diagnosis can be challenging without contrast. Excretory urography is a valuable tool for these cases but can be challenging to deliver because of the small blood vessels in these birds. The intraosseous (IO) route is an alternative but had not been previously evaluated. In this study, the authors evaluated the feasibility and safety of IO iodixanol via

the proximal tibiotarsus for producing diagnostic excretory urograms in budgerigars. Twenty clinically healthy adult budgerigars were exposed to serial radiographs over time (0, 1, 2, 3, 4, 5, 10, 15, 20, 30, 60 minutes and 24 hours) after IO iodixanol. The kidneys, ureters, and cloaca were observed immediately postinjection and at the time of maximum renal opacity. There were no significant differences in the length or height of the cranial part of kidney among the 3 measured time points. This study found that excretory urography using IO iodixanol into the proximal tibiotarsus was safe and practical in budgerigars.

**Lipid disorders in psittacine birds: diagnosis and clinical management.** Beaufrère H. *Vet Clin North Am Exot Anim Pract.* 2026;29:103–123.

Psittacine birds can experience many of the same lipid disorders observed in humans because of diet and a lack of exercise, including dyslipidemia, atherosclerosis, hepatic lipidosis, and adipocytic tumors. These disorders can lead to significant morbidity and mortality in birds under human care. Several risk factors have been identified, including species-specific predispositions, type of diet, amount and quality of exercise, and reproductive status. To reduce the risk of disease, much as is recommended for humans, early diagnosis through lipidologic assays and imaging as well as comprehensive interventions involving modifications to the diet, establishing consistent exercise routines, and treatments with omega-3 fatty acid supplements and lipid-lowering therapeutics are needed. In this review, specific recommendations that address these risk factors are made that focus on improving clinical outcomes and ensuring the long-term health and welfare of psittacine birds under human care.

**Cardiovascular disease in birds of prey.** Duvall A. *Vet Clin North Am Exot Anim Pract.* 2026;29:69–87.

Cardiovascular disease is being studied in psittacine birds, and many of the risk factors associated with dyslipidemia in humans, including diet and lack of exercise, have been found to play roles in the health of these birds. Unfortunately, the same level of study is not available in birds of prey although these birds are often under human care because of injuries sustained in the wild or as education animals. Birds of prey managed long term as education animals may be at increased risk for the development of cardiovascular disease due to limitations in their captive diets and the extent of exercise that is possible because these birds often have injuries that prevent exercise. Specific disease processes, such as atherosclerosis, can develop from dyslipidemia

and inactivity in these birds, leading to acute death. Moreover, cardiomyopathy, arrhythmias, myocarditis, and endocarditis are also noted in birds of prey, often secondary to infections or toxins (eg, lead). To date, treatment options are limited because of a lack of evidence-based research and primarily focus on supportive care, dietary adjustments, and off-label use of cardiovascular drugs. Studies evaluating these diseases in these birds of prey and potential therapeutics are much needed.

**Great cormorants and grey herons depredating at finfish aquaculture: factors affecting the human–wildlife conflict.** Ekblad C, Westerborn M, Laaksonen T, et al. *Ambio.* 2026;55:164–175.

As humans expand their footprint on this planet, there is an increased risk for negative interactions with wildlife. This becomes a significant concern when the human–wildlife conflict occurs over different forms of farming, such as sustainable aquaculture. Piscivorous birds can be challenging to manage in these systems because they can become habituated to these “easy” meals. In this study, the authors used surveillance cameras to quantify depredation pressure of birds at fish farms along the Finnish coast. Pressure varied between farms, from no bird visits to others seeing daily losses of hundreds of fish. Grey herons (*Ardea cinerea*) depredated 2–5 times more fish than cormorants, which was surprising because the cormorants are perceived as greater threats. Depredation rates were found to decrease relative to increasing fish size. Raptors were seldom found hunting at these farms but did pursue larger fish when they did. While protective nets were effective against raptors and cormorants, grey herons were not dissuaded by them and instead used them as depredation platforms. Using evidence-based research is key to identifying sources of human–wildlife conflict so that appropriate mitigation methods can be instituted that protect both human interests and the ability of wildlife to navigate an expanding human footprint into their world.

**Assessment of exposure to pesticides, anticoagulant rodenticides, and PFASs in the blood of top-predator birds by LC-MS/MS analysis.** Fernández-García A, Camacho FM, Moreno-González D, et al. *Environ Res.* 2026;288:123270.

Humans have used chemicals for a variety of purposes, all to make our lives easier and more convenient. Unfortunately, these chemicals often spill out into the environment and can impact wildlife. This was an obvious issue in our past with dichlorodiphenyltrichloroethane (DDT). Raptors were especially impacted

by DDT, with many species (eg, bald eagles [*Haliaeetus leucocephalus*]) experiencing significant declines. While we identified that concern and discontinued the use of DDT, chemical pollution remains a primary contributing factor to the global decline of wildlife. Persistent organic pollutants and contaminants of emerging concern are the current threats to human and wildlife health. In this study, raptors were used to assess the risk of these chemicals because of their role as top predators in the environment and likelihood for biomagnifying these chemicals. A total of 136 blood samples were collected from the chicks of Eurasian eagle-owls (*Bubo bubo*), common buzzards (*Buteo buteo*), common kestrels (*Falco tinnunculus*), and white storks (*Ciconia ciconia*) for this study. Liquid chromatography coupled to tandem mass spectrometry was used to measure 112 organic pollutants, including plant protection products (PPPs), per- and polyfluoroalkyl substances (PFASs), and anticoagulant rodenticides (ARs). Twelve of these compounds (5 PPPs, 3 PFASs, and 4 ARs) were detected in these raptors. The herbicide 2-methyl-4-chlorophenoxyacetic acid was measured in all 4 species. Perfluorooctane sulfonate was also detected in all 4 species; 100% of the white stork samples were positive. First and second generation ARs were only measured in Eurasian Eagle-owls, with brodifacoum showing the highest concentration. Concentrations of organic pollutants were correlated to land use around the nest, with PPPs mainly related to agriculture and PFASs tied to urban

areas. These results highlight the risks of exposure to wildlife (and thus humans) in this environment.

**Development of a duplex LNA-TaqMan real-time quantitative PCR for differential detection of virulent and attenuated strains of Muscovy duck–origin goose parvovirus.** Lin S, Chen X, Zhu X, et al. *J Virol Methods*. 2026;340:115276.

Viral diseases in birds are understudied. A primary reason for this is related to limited diagnostic testing. The purpose of this study was to develop a real-time quantitative polymerase chain reaction (PCR) assay for detecting and differentiating virulent and attenuated strains of Muscovy duck–origin goose parvovirus (MDGPV). A pair of common primers and 2 specific locked nucleic acid (LNA)-TaqMan probes targeting the conserved VP1 gene region were designed and synthesized based on MDGPV genome sequences from GenBank. By labeling the probes, the optimal primer-probe combination was identified that could detect both virulent and attenuated MDGPV strains without cross-reactivity with other waterfowl viruses. The PCR assay performed well, with a detection limit of  $6.1 \times 100$  copies/ $\mu$ L and a coefficient of variation of  $<3\%$ . The results of this study confirmed that this PCR assay could be used to differentiate virulent and attenuated strains of MDGPV in clinical samples and be used for developing mitigation standards to control MDGPV.