

## Colibacillosis (*E. coli*)

By: Caroline Gillies, MSc and Dr. Anastasia Novy

### Etiology

Colibacillosis describes any clinical infection, localized or systemic, caused by the bacterium *Escherichia coli*. *E. coli* is a gram-negative rod-shaped bacterium that can grow with or without the presence of oxygen. Although some strains of *E. coli* are harmless and even beneficial, pathogenic strains have the potential to cause severe infection. *E. coli* infections can be secondary to other diseases, the results of environmental stressors or be the cause of a primary infection. Infections in young birds can result in high mortality, while infection in older birds typically results in elevated culling and higher condemnation rates.

*E. coli* can be inactivated at 60°C for 30 minutes, or 70°C for 2 minutes. However, it is resistant to freezing and can survive in litter for 6 to 22 weeks at 4°C, compared to 1 to 2 days at 37°C. *E. coli* can live, but growth is stunted, by a pH less than 4.5 or a pH greater than 9. Additionally, *E. coli* is resistant to some disinfectants, so be sure to consult GPVS when choosing a product for washing and disinfecting your barn and water lines.

### Epidemiology and Transmission

Pathogenic strains of *E. coli* are present worldwide and have the potential to infect any avian species.

The primary route of transmission of *E. coli* is by direct contact with contaminated water or feces, either by ingestion or contact with an open wound (e.g., scratches). Inhalation of aerosol particles (e.g., in dusty environments) containing *E. coli* can also lead to infection. Vertical transmission (i.e. from parent to offspring) can occur when the oviduct contains a pathogenic strain of *E. coli*, and this is passed on to the egg, typically causing clinical infection in young chicks.

Darkling beetles and houseflies contribute to spread of pathogenic *E. coli* by acting as carriers of the bacteria. When a bird eats a contaminated darkling beetle or housefly, or consumes the feces of these pests, they can contract an *E. coli* infection.

## Clinical signs

The clinical signs of colibacillosis can differ depending on where the bacteria has infected the body.

- Lameness
- Lethargy
- Reduced growth
- Reduced feed and water intake
- Nasal discharge
- Difficulty breathing
- Increased mortality
- Decreased egg production
- Increased condemnations for cellulitis

## Treatment

Colibacillosis can occur secondary to another pathogen, so it is important to have a post-mortem examination performed by a veterinarian to determine the cause of illness in the flock.

Antibiotics prescribed by a veterinarian can be used to treat colibacillosis. However, antibiotic resistance is a growing concern. Alternative treatments, such as probiotics, prebiotics, organic acids, and phytochemicals, can be used for organic, RWA, and drug-resistant flocks.

## Prevention

*E. coli* vaccines are regularly used in breeders for the prevention of spread to progeny, and to layers to prevent challenges in performance. Vaccination is also available for broilers and turkeys to reduce the risk and severity of *E. coli* infections.

Biosecurity is essential in reducing the risk of infection. This includes washing and disinfecting of the barn, regular sanitation of water lines, separate boots and clothing for each barn, and pest control measures.

## Resources

Dzvia, F., Stevens, M.P. Colibacillosis in poultry: unravelling the molecular basis of virulence of avian pathogenic *Escherichia coli* in their natural hosts. *Avian Pathology* (2008); 37(4): 355-366. doi: <https://doi.org/10.1080/03079450802216652>

Kika, T.S., Cocoli, S., Pelic, D.L., Puvaca, N., Lika, E., Pelic, M. Colibacillosis in modern poultry production. *Journal of Agronomy, Technology, and Engineering Management* (2023); 6(6): 975-987. doi: <https://doi.org/10.55817/YZFA3391>

Mak, P.H.W., Rehman, M.A., Kiarie, E.G., Topp, E., Diarra, M.S. Production systems and important antimicrobial resistant-pathogenic bacteria in poultry: a review. *Journal of Animal Science and Biotechnology* (2022); 13: 148. doi: <https://doi.org/10.1186/s40104-022-00786-0>

Nolan, L.K., Barnes, H.J., Vaillancourt, J., Abdul-Aziz, T., Logue, C.M. Diseases of Poultry. *John Wiley and Sons Inc.* (2013); pg. 1402-1465. doi: <https://doi.org/10.1002/9781119371199>

Sargeant J.M., Bergevin M.D., Churchill, K., Dawkins, K., Deb, B., Dunn, J., Logue, C.M., Novy, A., O'Connor, A., Reist, M., Winder, C.B. The efficacy of antibiotics to control colibacillosis in broiler poultry: a systematic review. *Animal Health Research Reviews* (2019); 20: 263-273. doi: <https://doi.org/10.1017/S1466252319000264>