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FOODBORNE PATHOGENS IN UKRAINIAN POULTRY: AMR AND WGS EVIDENCE

ПАТОГЕНИ ХАРЧОВОГО ПОХОДЖЕННЯ В ПТАХІВНИЦТВІ УКРАЇНИ: АНТИМІКРОБНА РЕЗИСТЕНТНІСТЬ (AMR) ТА ДОКАЗИ ПОВНОГЕНОМНОГО СЕКВЕНУВАННЯ (WGS)

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Poultry production is among the most intensive livestock sectors and makes a substantial contribution to food security due to short production cycles, rapid return on investment, and high-quality products. In Ukraine, the poultry industry supplies the domestic market and is strongly export-oriented, ranking fifth among global exporters with a 3.4% share [1, c. 1].

At the same time, the consumption and processing of poultry meat are associated with foodborne zoonotic risks due to contamination with bacterial pathogens, particularly *Salmonella* spp., *Listeria monocytogenes*, and *Campylobacter* spp. [2, c.853; 3, c. 1].

Aim: To highlight the risks posed by foodborne zoonoses (*Campylobacter* spp., *Salmonella* spp., and *L. monocytogenes*) in Ukrainian poultry production, and to emphasise the importance of AMR profiling and whole-genome sequencing (WGS) for national monitoring within a “One Health” framework

Materials and Methods. The study used: data from the Public Health Center of the Ministry of Health of Ukraine on campylobacteriosis incidence (2014–2023); analysis of official reports from laboratories of the State Service of Ukraine on Food Safety and Consumer Protection (including 2009–2025 reports on *Campylobacter*); original bacteriological testing of 76 broiler caecal samples for isolation of *Campylobacter*; antimicrobial susceptibility testing of *Campylobacter* isolates; WGS of two isolates (*C. jejuni* and *C. coli*) and analysis of 2025 testing results on contamination of poultry meat/products with *Salmonella* spp. and *L. monocytogenes*, including swab results from equipment/utensils.

Results and discussion

Campylobacter jejuni and *Campylobacter coli* are among the most common causes of bacterial gastroenteritis in humans, with poultry meat implicated as the source in up to 80% of cases. In poultry, *Campylobacter* spp. are commensals and may reach concentrations of up to 10⁹ CFU per gram of faeces [4, c. 1].

Carcass contamination during slaughter can introduce pathogens into the food chain. According to Public Health Center data (2014–2023), 1,372 campylobacteriosis cases were reported in regions with intensive poultry production. [5, c. 95]. In contrast, official laboratory reports from the State Service (2009–2025) do not record *Campylobacter* in samples from chickens, which may indicate insufficient diagnostic sensitivity and/or under-detection. In our investigation of 76 broiler caecal samples, 20 isolates were recovered (26.3%). [6, c. 1870] Earlier studies reported a broiler prevalence of 3.5% [2, c. 854].

A key “One Health” challenge is antimicrobial resistance (AMR) in *Campylobacter*, which the WHO classifies as a high-priority pathogen [7, c. 1] In poultry-derived isolates, resistance was observed to ciprofloxacin (76.2%), erythromycin (19.0%), and tetracycline (52.4%) [8, c. 638].

To assess genomic diversity, WGS was performed for two Ukrainian isolates (*C. jejuni* and *C. coli*). [9, c. 1] Both carried seven AMR markers (including multidrug efflux pumps) and multiple virulence-associated factors (63 in *C. coli* and 102 in *C. jejuni*). The *C. jejuni* genome was closely related

to NCTC 11168 (GenBank accession SZUC00000000.1; ATCC 700819), and *C. coli* to OR12 (GenBank accession CP013733.1). Aerotolerance may support survival outside the host and on food products, with relevance to public health [7, c. 153-154].

***Salmonella* spp.** *Salmonella enterica* ranks second among causes of foodborne infections and is most commonly associated with poultry meat, a major source of diverse non-typhoidal *Salmonella* (NTS) serovars [10, c. 14]. Despite state control measures for salmonellosis across poultry production stages, a substantial gap remains in routine AMR profiling of *Salmonella* isolates.

We analysed results of 2025 monitoring for *Salmonella* contamination in poultry meat and poultry products. *Salmonella* spp. were isolated in 76 instances; 50% of isolates were serotyped: *S. Infantis* – 25, *S. Rissen* – 1, *S. Tennessee* – 4 та *S. Enteritidis* – 8. From pathological/biological samples from poultry, *S. Infantis* (28 isolates) and *S. Enteritidis* (3 isolates) were recovered.

Salmonella Infantis is an emerging zoonotic pathogen frequently associated with high antimicrobial resistance, undermining treatment effectiveness, particularly in resource-limited settings [11, c. 1].

Listeria monocytogenes. *L. monocytogenes* is among the most hazardous foodborne pathogens in humans, with reported case fatality up to 30%, and is a persistent contaminant of raw materials, food products, and slaughterhouse environments [12, c. 31]. Poultry meat contamination is more often linked to slaughter and processing than to primary production [13, c. 1]. According to State Service laboratory reports, seven cases of poultry listeriosis were recorded during 2018–2025 (Zaporizhzhia, Kyiv, and Cherkasy regions).

L. monocytogenes can grow across a broad pH range (4.5–9) and temperatures (0–43°C), and is able to multiply at refrigeration temperatures (~+4°C). Risk increases with inappropriate temperature control and prolonged storage of contaminated products [12, c. 39]. This is why listeriosis is sometimes referred to as the “refrigerator disease”.

In 2025, eight *L. monocytogenes* strains (0.05%) were isolated from poultry meat and processed products. However, the pathogen was not detected in 3,144 swabs from tools/equipment in poultry farms, slaughter/processing facilities, refrigerators, and freezers – potentially reflecting limitations in the sensitivity of bacteriological methods. Therefore, domestic poultry as a reservoir of *L. monocytogenes* should remain under surveillance to support microbial risk assessment in poultry processing environments.

Conclusions. The findings indicate that poultry production in Ukraine may represent an important reservoir of bacterial foodborne pathogens and

AMR. *Campylobacter* was detected in 26.3% of broilers despite its apparent “absence” in official reporting, and showed high resistance, particularly to ciprofloxacin (76.2%) [6, с. 1870; 8, с. 638]. In 2025, the *Salmonella* structure was dominated by the emerging serovar *S. Infantis*, which is associated with multidrug resistance [11, с. 1]. *L. monocytogenes* was detected in poultry products (0.05%), with contamination more likely to arise during slaughter/processing stages [12, с. 31; 13, с. 1]. Priorities include integrated control of *Campylobacter* and *Salmonella* with systematic AMR profiling and phased implementation of WGS, alongside strengthened biosecurity and prevention of cross-contamination within a “One Health” approach [7, с. 1].

Bibliography:

1. AgroWeek. URL: <https://agroweek.com/agrobiznes/vyrobnytstvo-yasa-ptytsi-ukrayini-zroste/> (дата звернення: 22.02.2026).
2. Shchur N., Chechet O., ... & Nedosekov V. Prevalence and antimicrobial resistance of *Campylobacter* isolated from animals and poultry in Ukraine. *Adv. Anim. Vet. Sci.* 2023. Vol. 11, Iss. 5. P. 852–863. <http://dx.doi.org/10.17582/journal.aavs/2023/11.5.852.863>
3. Sharma S., Kaur S., ... & Abdelaziz K. Major foodborne bacterial pathogens in poultry: implications for human health and the poultry industry and probiotic mitigation strategies. *Microorganisms*. 2025. Vol. 13, Iss. 10. P. 2363. <https://doi.org/10.3390/microorganisms13102363>
4. Naguib M., Comfort S. O., ... & Abdelaziz K. Mucosal delivery (in ovo and oral) of chitosan nanoparticle-based subunit vaccine enhances resistance against *Campylobacter jejuni* colonization in broiler chickens. *Vaccine*. 2026. Vol. 72. 128116. <https://doi.org/10.1016/j.vaccine.2025.128116>.
5. Корнієнко Л. Є., Куликова В. В., ... та Видайко Н. Б. Епізоотологічні та епідеміологічні аспекти кампілобактеріозу в Україні. *Ветеринарія, технології тваринництва та природокористування*. 2025. 11. С. 92–101.
6. Shchur N, Mazur T, ... & Nedosekov V. Improving the efficiency of *Campylobacter* spp. isolation from livestock and poultry in Ukraine. *Adv. Anim. Vet. Sci.* 2024. Vol. 12, Iss. 10. P. 1862–1874. <https://dx.doi.org/10.17582/journal.aavs/2024/12.10.1862.1874>
7. Щур Н. В. Характеристика ізолятів *Campylobacter* spp., виділених від свійських тварин в Україні: дис. д-ра філософії в галузі вет. медицина ; НУБіП України. Київ, 2025. 212 с.
8. Shchur N. V., Stepanskyi D. O., ... & Nedosekov V. V. Phenotypic patterns of antimicrobial resistance in *Campylobacter* spp. in Ukraine.

Regulatory Mechanisms in Biosystems. 2024. 15, 3. P. 635–641. doi:10.15421/022491.

9. Halka I., Shchur N., ... & Kovalenko G. Genome Sequences of Antimicrobial-Resistant *Campylobacter coli* and *Campylobacter jejuni*, Isolated from Poultry in Ukraine. *Microbiol. Resour. Announc.* 2024. 13. <https://doi.org/10.1128/mra.00795-24>

10. Shchur N., Shevchenko M., ... & Nedosekov V. Emergence of Salmonella Senftenberg in animal feeds in Ukraine: Antimicrobial resistance and biofilm formation. *Ger. J. Microbiol.* 2025. 5. P. 13–26. <https://doi.org/10.51585/gjm.2025.2.0050>

11. Alvarez D. M., Barrón-Montenegro R., ... & Moreno-Switt A. I. A review of the global emergence of multidrug-resistant Salmonella enterica subsp. enterica Serovar Infantis. *Int J Food Microbiol.* 2023. 403, 110297. <https://doi.org/10.1016/j.ijfoodmicro.2023.110297>

12. Togachynska L., Kulykova V., ... & Shchur N. Study of the cultural properties of *Listeria monocytogenes* /*Listeria* spp under different storage temperature regimes. *One Health Journal*. 2026. 4, I. P. 32–40. <https://doi.org/10.31073/onehealthjournal2026-I-02>

13. Iannetti L., Schirone M., ... & Pomilio F. *Listeria monocytogenes* in poultry: Detection and strain characterization along an integrated production chain in Italy. *Food microbiology*. 2020. 91, 103533. <https://doi.org/10.1016/j.fm.2020.103533>