



## Article

# Clonal Dissemination of Extended-Spectrum Cephalosporin-Resistant *Enterobacterales* between Dogs and Humans in Households and Animal Shelters of Romania

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**Abstract:** Faecal carriage of extended-spectrum cephalosporin-resistant (ESC-R) *Enterobacterales* in healthy pets is a concerning issue. This study aimed to determine the prevalence, genetic background, and potential for interspecies transmission of these bacteria between dogs and humans within the same household (HH) or shelter environment in Romania. Faecal samples ( $n = 263$ ) collected from healthy dogs ( $n = 102$ ), their owners ( $n = 32$ ), as well as dogs ( $n = 110$ ) and staff ( $n = 19$ ) from dog shelters, were screened for ESC-R carriage. Clonal relatedness of canine and human *Escherichia coli* isolates was established using Fourier Transform Infrared Spectroscopy (FTIR), followed by Illumina WGS of selected isolates. The highest prevalence of ESC-R *Enterobacterales* faecal carriage was identified in staff working at dog shelters (78.9%), followed by dogs from households (44.11%), dog owners (43.7%), and dogs from shelters (27%). FTIR identified 15 clusters of closely related *E. coli* isolates, including dog and human isolates from the same environment. Co-carriage of ESC-R isolates in both the dog and owner was identified in 12 HHs (37.5%), with two HHs (6%) having both the owner and dog carrying isolates with identical FTIR spectra, phylogroup, resistance genes, and *lnc* plasmids. Major ExPEC lineages such as ST127, ST10, ST155, and ST68 were detected in human and dog isolates. Our study revealed a high prevalence of faecal ESC-R *E. coli* carriage in both dogs and humans from Romanian households and shelters, where bidirectional clonal transmission between humans and dogs is likely. Furthermore, we identified ESC-R *Enterobacterales* co-carriage in people and dogs sharing the same environment using FTIR, demonstrating its value in AMR surveillance for humans and animals.

**Keywords:** cephalosporin-resistance; faecal-carriage; transmission; companion animals



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## 1. Introduction

Production of extended-spectrum beta-lactamases (ESBLs) remains one of the most important resistance mechanisms to extended-spectrum cephalosporins (ESCs; e.g., cefepime, cefotaxime, ceftazidime, and ceftioxaone) in *Enterobacterales* from both humans and animals [1,2]. In addition, numerous studies over the last two decades have shown that extended-spectrum cephalosporin-resistant (ESC-R) *Enterobacterales* have been isolated with increasing frequency from humans and animals [3,4]. Importantly, the presence of ESBL, AmpC beta-lactamase, and plasmid-mediated quinolone resistance (PMQR) genes on mobile genetic elements facilitates horizontal transmission leading to multidrug resistant (MDR) isolates in both human and animal hosts [2,5]. In addition, ESBL resistance genes also have the potential to spread via successful bacterial clones or lineages (Woodford,

# The Household Of Animal Medicine A Spectrum

**Karin Nielsen-Saines**



## **The Household Of Animal Medicine A Spectrum:**

**Medicine and the Market in England and its Colonies, c.1450- c.1850** M. Jenner,P. Wallis,2007-09-12 What was the medical marketplace This book provides the first critical examination of medicine and the market in pre modern England colonial North America and British India Chapters explore the most important themes in the social history of medicine and offer a fresh understanding of healthcare in this time of social and economic transformation Practice Management, An Issue of Veterinary Clinics of North America: Small Animal Practice, E-Book Peter Weinstein,2024-02-02 In this issue of Veterinary Clinics Small Animal Practice guest editor Dr Peter Weinstein brings his considerable expertise to the topic of Practice Management Operating a successful small animal veterinary practice requires wide ranging knowledge and familiarity with a multitude of issues In this issue top experts provide resources that help readers better understand the business of veterinary practice and the tools to help them decide to own a hospital manage a practice or more effectively lead a practice that they already own Contains 16 relevant practice oriented topics including what the future of veterinary practice looks like digital marketing and social media optimal team utilization leads to team retention top ten practice management mistakes workplace culture and more Provides in depth clinical reviews on practice management offering actionable insights for clinical practice Presents the latest information on this timely focused topic under the leadership of experienced editors in the field Authors synthesize and distill the latest research and practice guidelines to create clinically significant topic based reviews **Hearings, Reports and Prints of the House Committee on Interstate and Foreign Commerce** United States. Congress. House. Committee on Interstate and Foreign Commerce,1965 **Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations for 1994** United States. Congress. House. Committee on Appropriations. Subcommittee on Agriculture, Rural Development, Food and Drug Administration, and Related Agencies,1998 **Veterinary Controversies and Ethical Dilemmas** Tanya Stephens,R. Eddie Clutton,Polly Taylor,Kathy Murphy,2025-09-22 This book identifies increasing concerns with the veterinary profession and confronts them provocatively with a view to stimulating positive change A central theme is the emergence of the profitable fur baby which is being propagated through encouraged anthropomorphism a limited evidence base overdiagnosis overtreatment and practice corporatisation Richly accompanied with thoughts on veterinary celebrity the misrepresentation of veterinary success research using client owned animals unregulated treatments and end of life decision making the book represents a small room full of large elephants With experienced contributors from around the world each chapter combines personal stories with evidence based reflections While many of the subjects presented will have undergone some degree of ethical analysis the book itself does not intend to teach veterinary ethics instead its role is to identify key concerns with the profession s current trajectory and to present them with candour from the perspective of concerned veterinary professionals Ideal for use within the veterinary curriculum to stimulate undergraduate thought and discussion this book will also be a

valuable reference for practitioners as the veterinary profession comes to terms with life in a post truth era      **Handbook on Animal-Assisted Therapy** Aubrey H Fine, 2019-06-27 Handbook on Animal Assisted Therapy Foundations and Guidelines for Animal Assisted Interventions Fifth Edition highlights advances in the field with seven new chapters and revisions to over 75% of the material This book will help therapists discover the benefits of incorporating animal assisted therapy into their practice how to design and implement animal assisted interventions and the efficacy of animal assisted therapy with different disorders and patient populations Coverage includes the use of AAT with children families and the elderly in counseling and psychotherapy settings and for treating a variety of specific disorders Contains seven new chapters in addition to 75% new or revised material Includes guidelines and best practices for using animals as therapeutic companions Addresses specific types of patients and environmental situations Includes AAI working with cats dogs birds and horses Discusses why animals are used in therapy as well as how      **Hearings, Reports and Prints of the House Committee on Appropriations** United States. Congress. House. Committee on Appropriations, 1971      *Hearing to Review the Advances of Animal Health Within the Livestock Industry* United States. Congress. House. Committee on Agriculture. Subcommittee on Livestock, Dairy, and Poultry (2007-2012), 2009      *Antibiotic Resistance and the Use of Antibiotics in Animal Agriculture* United States. Congress. House. Committee on Energy and Commerce. Subcommittee on Health, 2013      **Small Animal Clinical Pharmacology E-Book** Jill E. Maddison, Stephen W Page, David B Church, 2008-02-13 The eBook version of this title gives you access to the complete book content electronically Evolve eBooks allows you to quickly search the entire book make notes add highlights and study more efficiently Buying other Evolve eBooks titles makes your learning experience even better all of the eBooks will work together on your electronic bookshelf so that you can search across your entire library of Veterinary Medicine eBooks Please note that this version is the eBook only and does not include the printed textbook Alternatively you can buy the Text and Evolve eBooks Package which gives you the printed book plus the eBook Please scroll down to our Related Titles section to find this title Small Animal Clinical Pharmacology is a practical clinically oriented pharmacology text designed to provide the veterinary student and practitioner with all the relevant information needed when designing drug treatment regimens for pets in small animal veterinary practice Comprehensively updated and revised the second edition of this core text covers essential new information on drugs used in the management of a range of presenting conditions including heart disease and cardiac arrhythmias For the second edition new authors superb new illustrations and a second colour have all been introduced With its unique approach combining a thorough understanding of the pharmacological action of drugs with a basic understanding of the relevant physiology and pathophysiology of systems and tissues affected Small Animal Clinical Pharmacology continues to be an indispensable book for all veterinary students and practitioners Organised by drug class in a uniform and detailed structure which means it is easy to locate key information on dose rates routes of administration drug interactions and special considerations at a glance Key chapters based around treatment of disorders of particular body

systems eg cardiovascular and thyroid disorders Essential introductory chapters covering pharmacokinetics general pharmacological principles and adverse reactions for a thorough basic grounding in the subject All authors are experienced clinicians and recognised experts in their field who bring a down to earth and practical approach to the text     **Advances in Animal Health, Medicine and Production** Antonio Freitas Duarte,Luís Lopes da Costa,2020-11-21 This book brings together in a review manner a comprehensive summary of high quality research contributions from the different research teams and their collaborators to celebrate the 25th anniversary of the Centre for Interdisciplinary Research in Animal Health CIISA The topics span from animal behaviour and welfare over biotechnology to clinical veterinary medicine Thus the book is of interest for researchers and students working in the diverse fields of veterinary medicine and science The Centre for Interdisciplinary Research in Animal Health CIISA the Research Centre of the Faculty of Veterinary Medicine of the University of Lisbon commemorated its 25th year jubilee in 2018 Throughout its history CIISA has been consolidating as the top ranking Portuguese Animal and Veterinary Sciences research unit More recently CIISA has taken a leading role in the coordination of national and international research networks and consortiums This conveyed a highly interdisciplinary nature to CIISA s research encompassing animal veterinary and biomedical sciences This multi and interdisciplinary nature is reflected on the broad scientific background of the team     *Journal of the House of Representatives of the United States* United States. Congress. House,2006 Some vols include supplemental journals of such proceedings of the sessions as during the time they were depending were ordered to be kept secret and respecting which the injunction of secrecy was afterwards taken off by the order of the House     *Handbook on Animal-Assisted Therapy* Megan Mueller,Zenithson Ng,Taylor Chastain Griffin,Philip Tedeschi,2024-09-20 Handbook on Animal Assisted Therapy Sixth Edition continues to be the leading textbook and reference in this field for clinical practitioners The book provides the evidence basis for the effectiveness of this treatment as well as guidelines for how to perform it from the selection of treatment animal to application with patients This new edition is fully updated and contains 15 new chapters on culture research standards of practice and more Organized into four sections the book explores the conceptualization of the animal human bond best practices for AAI professionals considerations related to animal selection training welfare and utilizing AAI in special populations The book may serve as a study guide for the Animal Assisted Intervention Specialist Certification Exam Summarizes current research on AAT Guides readers how to work with a therapy animal safely and effectively Covers AAT with special populations and for specific disorders Supports study for the Animal Assisted Intervention Specialist Certification exam Contains 15 new chapters on culture research standards of practice and more     **Genetics of Acquired Antimicrobial Resistance in Animal and Zoonotic Pathogens** Axel Cloeckaert,Michel Stanislas Zygmunt,Benoît Doublet,2018-01-26 Development and spread of antimicrobial resistance is the result of an evolutionary process by which microorganisms adapt to antibiotics through several mechanisms including alteration of drug target by mutation and horizontal transfer of resistance genes The

concomitant occurrence of independent antimicrobial resistance mechanisms is a serious threat to human health and has appeared in several emerging epidemic clones over the past decade in humans and also in animals The increasing prevalence of antimicrobial drug resistance among animal and zoonotic foodborne pathogens is of particular concern for public health In this Ebook we gathered a collection of articles which deal with the most important aspects of the genetics of acquired antimicrobial resistance extending from medically important resistance emerging epidemic resistant clones main mobile genetic elements spreading resistance resistomes dissemination between animals and humans to the One Health concept

**Low-Cost Veterinary Clinical Diagnostics** Ryane E. Englar, Sharon M. Dial, 2023-02-22 Low Cost Veterinary Clinical Diagnostics A practical guide to maximizing the diagnostic value of in house quick assessment tests QATs In Low Cost Veterinary Clinical Diagnostics the authors provide a hands on resource designed to facilitate healthcare delivery across the spectrum of care Historically clinicians have been taught to apply the gold standard approach to the practice of medicine However recent advances in veterinary medical care and associated technologies have made practitioners question whether a one size fits all approach is truly best After all when we perform diagnostic tests are we testing out of the desire for completeness to cover all bases for the good of the patient Or are we testing because we are expected to The reality is that gold standard care is not always advisable and not always possible In clinical practice veterinarians frequently encounter obstacles that limit their approaches to case management Cost of care is a significant constraint that requires practitioners to rethink which diagnostic tests are essential Not every patient requires a complete blood count CBC chemistry profile urinalysis and fecal analysis to obtain diagnostic value This text suggests that the best approach to case management be determined by the situation the context the patient and the client While sophisticated panels of tests may remain the recommended approach to case management Low Cost Veterinary Clinical Diagnostics outlines entry level in house diagnostic blood urine fecal and body cavity fluid tests how to perform them as well as the breadth and depth of patient specific data that can be gleaned from quick assessment tests QATs Readers will also find A thorough introduction to patient care considerations communication strategies that facilitate cost conscious shared decision making Comprehensive explorations of quick assessment tests QATs in hematology including packed cell volume PCV total solids TS buffy coat analysis blood smears blood glucose blood urea nitrogen BUN saline agglutination tests and activated clotting time Practical discussions of quick assessment tests QATs involving urine including urine color dipstick analysis specific gravity USG and urine sediment analysis Pragmatic evaluation of fecal analysis including considerations surrounding fecal color volume consistency and odor saline smears or wet mounts and fecal flotation Discussion on body cavity fluid analysis Sample case vignettes complete with question and answer Q A Perfect for veterinary practitioners veterinary technicians veterinary and veterinary technician students Low Cost Veterinary Clinical Diagnostics offers a quick and easy reference guide to maximizing diagnostic value in those cases where care is cost prohibitive **A Family Encyclopaedia** George Crabb, 1831

Cumulative List of Organizations Described in Section 170 (c) of the Internal Revenue Code of 1954 ,1986

*Monographic Series* Library of Congress,1981

**Exploring Cats: Their Behaviors and Human-Cat Interactions**

Lynette Arnason Hart,Benjamin Hart,Emma Kathryn Grigg,Leslie Ann Lyons,Dennis Clair Turner,2023-12-27 Cats exceed dogs in their numbers as companion animals in the U S and much of Europe despite them not filling working roles In the past their prowess as mousers on farms sometimes made them essential but these days many cats lead leisurely lives in people s homes What accounts for them becoming such appreciated family members What are their behaviors that are so enticing Exactly how do they respond to us When are they preferred companion animals more than dogs What do we know about cultural differences in views about cats Their growing popularity and the relative paucity of data about owned cats living in homes emphasizes the importance of monitoring their welfare The anthrozoological research literature on companion animals includes extensive studies of dogs while contributing relatively few close looks at the special behaviors and traits of domestic cats that make them so desirable as companions We know little about the dynamics of our interactions with cats and the attachment shared with them which may differ in some ways for those we have with dogs Nor have we identified the specific contexts where cats are particularly or uniquely compatible How does the type of attachment affect and shape the bond relationship between human and cat How are cats as emotional support animals for people with special needs especially autism What new information do we have about the cognitive abilities of domestic cats and how these abilities shape cats behavior and relationships with humans How do early life experiences of cats influence their behavior as adults or their successful integration into human households Do cats fit best in certain residential settings or with specific types or ages of people This Research Topic provides an opportunity to update our understanding on the special qualities and behaviors of cats and to scrutinize our mutual interactions with these companions

**Exotic Small Mammal Care and Husbandry** Ron E. Banks,Julie M. Sharp,Sonia D. Doss,Deborah A. Vanderford,2013-05-23 Exotic Small Mammal Care and Husbandry is a practical reference for assessing handling and treating small exotic animals in the veterinary clinic Covering common species such as mice hamsters rabbits and ferrets the book focuses on nursing care giving veterinary staff the information they need to work with these less common patients With information on basic anatomy preventative care and common diseases Exotic Small Mammal Care and Husbandry provides a thorough grounding in the fundamentals of caring for small exotic mammals and communicating with owners

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