

EPIDEMIOLOGY AND INFECTION

EDITED BY

B. DRASAR

D. BAXBY K. A. V. CARTWRIGHT

M. H. HINTON S. PALMER

D. J. PLATT D. MORSE

**P. MORGAN-CAPNER
(MANAGING EDITOR)**

IN CONJUNCTION WITH

R. M. ANDERSON	D. H. LLOYD
R. D. BARRY	S. LOGAN
P. S. BRACHMAN	T. J. MARRIE
M. CHERNESKY	C. MARTÍN-BOURGON
M. DEGRÉ	O. H. MEURMAN
L. DEVRIESE	E. MILLER
R. G. FINCH	P. P. MORTIMER
R. J. GILBERT	R. SWANEPOEL
D. J. HAMPSON	E. J. THRELFALL
S. A. HOWELL	H. E. TILLETT
T. HUMPHREY	J. P. VANDENBROUCKE
J. C. DE JONG	P. J. WILKINSON
A. P. KENDAL	M. WOODWARD
J. B. KURTZ	

VOLUME 115, 1995



**CAMBRIDGE
UNIVERSITY PRESS**

Published by the Press Syndicate of the University of Cambridge
The Pitt Building, Trumpington Street, Cambridge CB2 1RP
40 West 20th Street, New York 10011-4211, USA
10 Stamford Road, Oakleigh, Melbourne 3166, Australia

© Cambridge University Press 1995

Printed in Great Britain by the Cambridge University Press, Cambridge

Contents

No. 1 (AUGUST 1995)

Characterization of verocytotoxin-producing <i>Escherichia coli</i> O157 isolates from patients with haemolytic uraemic syndrome in Western Europe	
Heuvelink, A. E., Van De Kar, N. C. A. J., Meis, J. F. G. M., Monnens, L. A. H. and Melchers, W. J. G.	1
The Public Health Laboratory Service national case-control study of primary indigenous sporadic cases of campylobacter infection	
Adak, G. K., Cowden, J. M., Nicholas, S. and Evans, H. S.	15
Infecting dose and severity of typhoid: analysis of volunteer data and examination of the influence of the definition of illness used	
Glynn, J. R., Hornick, R. B., Levine, M. M. and Bradley, D. J.	23
A pseudo-outbreak of salmonellosis	
Joce, R. E., Murphy, F. and Robertson, M. H.	31
Distribution of <i>Aeromonas</i> phenospecies and genospecies among strains isolated from water, foods or from human clinical samples	
Hänninen, M.-L. and Siitonen, A.	39
Carriage of <i>Staphylococcus aureus</i> among 104 healthy persons during a 19-month period	
Riewerts Eriksen, N. H., Espersen, F., Thamdrup Rosdahl, V. and Jensen, K.	51
Control of infection with multiple antibiotic resistant bacteria in a hospital renal unit: the value of plasmid characterization	
Reed, C. S., Barrett, S. P., Threlfall, E. J. and Cheasty, T.	61
Molecular characterization of a virulence-associated epitope on the lipopolysaccharide of <i>Legionella pneumophila</i> serogroup 1	
Helbig, J. H., Lück, P. C., Knirel, Y. A., Witzleb, W. and Zähringer, U.	71
Relationship between <i>Legionella</i> spp. and antibody titres at a therapeutic thermal spa in Portugal	
Rocha, G., Veríssimo, A., Bowker, R., Bornstein, N. and Da Costa, M. S.	79
Epidemiology of invasive <i>Haemophilus influenzae</i> infections in England and Wales in the pre-vaccination era (1990-2)	
Anderson, E. C., Begg, N. T., Crawshaw, S. C., Hargreaves, R. M., Howard, A. J. and Slack, M. P. E.	89
Application of pulsed field gel electrophoresis to the 1993 epidemic of whooping cough in the UK	
Syedabubakar, S. N., Matthews, R. C., Preston, N. W., Owen, D. and Hillier, V.	101
RAPD analysis of isolates of <i>Burkholderia pseudomallei</i> from patients with recurrent melioidosis	
Haase, A., Melder, A., Smith-Vaughan, H., Kemp, D. and Currie, B.	115
An outbreak of waterborne cryptosporidiosis associated with a public water supply in the UK	
Atherton, F., Newman, C. P. S. and Casemore, D. P.	123
Tuberculosis in Inner London: evidence for an increase in young adults and immigrants	
Barkham, T. M. S., Drury, A., Pearson, A. D., Dybowski, R. and Atkinson, H.	133
Interpretation of serological surveillance data for measles using mathematical models: implications for vaccine strategy	
Gay, N. J., Hesketh, L. M., Morgan-Capner, P. and Miller, E.	139
Prevalence of hepatitis A antibody among disadvantaged gypsy children in northern Spain	
Cilla, G., Perez-Trallero, E., Marimon, J. M., Erdozain, S. and Gutierrez, C.	157
An outbreak of viral gastroenteritis associated with adequately prepared oysters	
Chalmers, J. W. T. and McMillan, J. H.	163
Hand-genital transmission of genital warts? An analysis of prevalence data	
Fairley, C. K., Gay, N. J., Forbes, A., Abramson, M. and Garland, S. M.	169
Evidence for a high prevalence of spotted fever group rickettsial infections in diverse ecologic zones of Inner Mongolia	
Qing-Huai Liu, Guo-Ying Chen, Yan Jin, Meng Te, Li-Chun Niu, Shi-ping Dong and Walker, D. H.	177
Serological evidence for the reservoir hosts of cowpox virus in British wildlife	
Crouch, A. C., Baxby, D., McCracken, C. M., Gaskell, R. M. and Bennett, M.	185

Antigenic analysis of SAT 2 serotype foot-and-mouth disease virus isolates from Zimbabwe using monoclonal antibodies	
Davidson, F. L., Crowther, J. R., Nqindi, J., Knowles, N. J., Thevasagayam, S. J. and Van Vuuren, C. J.	193
Cryptosporidiosis reservoir in wild brown rats (<i>Rattus norvegicus</i>) in the UK	
Webster, J. P. and MacDonald, D. W.	207
Book Review	
Escherichia coli in Domestic Animals and Humans Giles, C. L.	211
Errata	
Direct milk excretion of <i>Campylobacter jejuni</i> in a dairy cow causing cases of human enteritis, by Orr, K. E., Lightfoot, N. F., Sisson, P. R. et al.	213
Predicting the impact of measles vaccination in England and Wales: model validation and analysis of policy options, by Babad, H. R., Nokes, D. J., Gay, N. J., Miller, E., Morgan-Capner, P. and Anderson, R. M.	213
 No. 2 (OCTOBER 1995)	
Comparison of PFGE, ribotyping and phage-typing in the epidemiological analysis of <i>Campylobacter jejuni</i> serotype HS2 infections	
Gibson, J. R., Fitzgerald, C. and Owen, R. J.	215
Salmonella outbreak from microwave cooked food	
Evans, M. R., Parry, S. M. and Ribeiro, C. D.	227
Clonal structure of invasive <i>Streptococcus pyogenes</i> in Northern Scotland	
Upton, M., Carter, P. E., Morgan, M., Edwards, G. F. and Pennington, T. H.	231
β-Lactam resistance in normal faecal flora from South Africa	
Shanahan, P. M. A., Thomson, C. J. and Amyes, S. G. B.	243
Prevalence and genetic location of non-transferable trimethoprim resistant dihydrofolate reductase genes in South African commensal faecal isolates	
Adrian, P. V., Thomson, C. J., Klugman, K. P. and Amyes, S. G. B.	255
PCR-based characterization of <i>Yersinia enterocolitica</i>: comparison with biotyping and serotyping	
Odinot, P. T., Meis, J. F. G. M., Van Den Hurk, P. J. J. C., Hoogkamp-Korstanje, J. A. A. and Melchers, W. J. G.	269
An outbreak of cryptosporidiosis in South London: what value the p value?	
Maguire, H. C., Holmes, E., Hollyer, J., Strangeways, J. E. M., Foster, P., Holliman, R. E. and Stanwell-Smith, R.	279
Poliomyelitis in the Netherlands: a review of population immunity and exposure between the epidemics in 1978 and 1992	
Rümke, H. C., Oostvogel, P. M., Van Steenis, G. and Van Loon, A. M.	289
A serosurvey of water-borne pathogens amongst canoeists in South Africa	
Taylor, M. B., Becker, P. J., Janse van Rensburg, E., Harris, B. N., Bailey, I. W. and Grabow, W. O. K.	299
Priorities in global measles control: report of an outbreak in N'Djamena, Chad	
Ndikuyuze, A., Cook, A., Cutts, F. T. and Bennett, S.	309
Measles vaccine efficacy during an outbreak in a highly vaccinated population: Incremental increase in protection with age at vaccination up to 18 months	
De Serres, G., Boulianne, N., Meyer, F. and Ward, B. J.	315
The development of an age structured model for schistosomiasis transmission dynamics and control and its validation for <i>Schistosoma mansoni</i>	
Chan, M. S., Guyatt, H. L., Bundy, D. A. P., Booth, M., Fulford, A. J. C. and Medley, G. F.	325
Laboratory reared <i>Amblyomma hebraeum</i> and <i>Amblyomma variegatum</i> ticks differ in their susceptibility to infection with <i>Cowdria ruminantium</i>	
Mahan, S. M., Peter, T. F., Semu, S. M., Simbi, B. H., Norval, R. A. I. and Barbet, A. F.	345
Roe deer as sentinels for endemicity of tick-borne encephalitis virus	
Gerth, H.-J., Grimshandl, D., Stage, B., Döller, G. and Kunz, C.	355
The transmission of Jembrana disease, a lentivirus disease of <i>Bos javanicus</i> cattle	
Soeharsono, S., Wilcox, G. E., Putra, A. A., Hartaningsih, N., Sulistyana, K. and Tenaya, M.	367
Book Review	
The Case Books of Dr John Snow	375

Special Article. Virology research and virulent human pandemics	
Mims, C. A.	377
A cluster of cases of streptococcal necrotizing fasciitis in Gloucestershire	
Cartwright, K., Logan, M., McNulty, C., Harrison, S., George, R., Efstratiou, A., McEvoy, M. and Begg, N.	387
Epidemiological investigation of an outbreak of meningococcal meningitis in Makkah (Mecca), Saudi Arabia, 1992	
Al-Gahtani, Y. M., El Bushra, H. E., Al-Qarawi, S. M., Al-Zubaidi, A. A. and Fontaine, R. E.	399
Targeted vaccination with meningococcal polysaccharide vaccine in one district of the Czech Republic	
Kriz, P., Vlckova, J. and Bobak, M.	411
Analysis of methicillin-resistant and methicillin-susceptible <i>Staphlococcus aureus</i> by a molecular typing method based on coagulase gene polymorphisms	
Kobayashi, N., Taniguchi, K., Kojima, K., Urasawa, S., Uehara, N., Omizu, Y., Kishi, Y., Yagihashi, A. and Kurokawa, I.	419
Biotype traits and antibiotic susceptibility of <i>Vibrio cholerae</i> serogroup O1 before, during and after the emergence of the O139 serogroup	
Mukhopadhyay, A. K., Garg, S., Balakrish Nair, G., Kar, S., Ghosh, R. K., Pajni, S., Ghosh, A., Shimada, T., Takeda, T. and Takeda, Y.	427
An epidemiological study of <i>Vibrio cholerae</i> O1 in the Australian environment based on rRNA gene polymorphisms	
Desmarchelier, P. M., Wong, F. Y. K. and Mallard, K.	435
The role of heightened surveillance in an outbreak of <i>Escherichia coli</i> O157. H7	
Roberts, C. L., Mshar, P. A., Cartter, M. L., Hadler, J. L., Sosin, D. M., Hayes, P. S. and Barrett, T. J.	447
Isolation of enterotoxigenic <i>Escherichia coli</i> from British troops in Saudi Arabia	
Willshaw, G. A., Cheasty, T., Rowe, B., Smith, H. R., Faithfull-Davies, D. N. and Brooks, T. G. J.	455
Adhesion of <i>Aeromonas</i> sp. to cell lines used as models for intestinal adhesion	
Kirov, S. M., Hayward, L. J. and Nerrie, M. A.	465
Antibiotic susceptibility of campylobacter isolates from sewage and poultry abattoir drain water	
Koenraad, P. M. F. J., Jacobs-Reitsma, W. F., Van der Laan, T., Beumer, R. R. and Rombouts, F. M.	475
The speciation and subtyping of campylobacter isolates from sewage plants and waste water from a connected poultry abattoir using molecular techniques	
Koenraad, P. M. F. J., Ayling, R., Hazleger, W. C., Rombouts, F. M. and Newell, D. G.	485
Effect of changes in processing to improve hygiene control on contamination of poultry carcasses with campylobacter	
Mead, G. C., Hudson, W. R. and Hinton, M. H.	495
Nationwide outbreak of human salmonellosis in Germany due to contaminated paprika and paprika-powdered potato chips	
Lehmacher, A., Bockemühl, J. and Aleksic, S.	501
Chaos under canvas: a <i>Salmonella enteritidis</i> PT 6B outbreak	
Brugha, R. F., Howard, A. J., Thomas, G. R., Parry, R., Ward, L. R. and Palmer, S. R.	513
Occurrence of <i>Listeria</i> species in ready to eat foods	
Wilson, I. G.	519
Faecal contamination on children's hands and environmental surfaces in primary schools in Leeds	
Kaltenthaler, E. C., Elsworth, A. M., Schweiger, M. S., Mara, D. D. and Brauholtz, D. A.	527
Prevalence of antibodies against <i>Entamoeba histolytica</i> in Mexico measured by ELISA	
González, C. R., Isibasi, A., Ortiz-Navarrete, V., Paniagua, J., García, J. A., Ramírez, A., Salvatierra, B., Tapia, R., Sepúlveda, J., Gutiérrez, G. and Kumate, J.	535
An outbreak of cryptosporidiosis associated with a resort swimming pool	
MacKenzie, W. R., Kazmierczak, J. J. and Davis, J. P.	545
Outbreak of cryptosporidiosis associated with a disinfected groundwater supply	
Bridgman, S. A., Robertson, R. M. P., Syed, Q., Speed, N., Andrews, N. and Hunter, P. R.	555
Inactivation of HIV-1 by chemical disinfectants: sodium hypochlorite	
Van Bueren, J., Simpson, R. A., Salman, H., Farrelly, H. D. and Cookson, B. D.	567

<i>Study of the effectiveness of influenza vaccination in the elderly in the epidemic of 1989–90 using a general practice database</i>	
Fleming, D. M., Watson, J. M., Nicholas, S., Smith, G. E. and Swan, A. V.	581
Analysis of influenza A virus reinfection in children in Japan during 1983–91	
Nakajima, S., Nishikawa, F., Nakamura, K. and Nakajima, K.	591
Measles vaccination policy	
Williams, B. G., Cutts, F. T. and Dye, C.	603
Book Reviews	
Population Genetics of Bacteria	623
ELISA: Theory and Practice	624
The Microbiology and Epidemiology of Infection for Health Science Students	624
Borna Disease	625
Guidelines for Standards in Laboratory Practice in Medical Microbiology	625
Textbook of Diagnostic Microbiology	626
Indexes	629

An invitation to be elected a

FELLOW of The ROYAL SOCIETY of MEDICINE



The ROYAL
SOCIETY of
MEDICINE

PATRON: HER MAJESTY QUEEN ELIZABETH II

Multi-disciplinary,
non-political, independent,
for almost two centuries
The Royal Society of Medicine has been working
to meet the professional
needs of physicians,
surgeons, dentists and their
colleagues involved in the
delivery of health care across
boundaries of all kinds
whether of profession,
specialty, nationality or age.

Founded in 1805, this historic and prestigious medical society is a British national medical institution – but with an international membership. Today, Fellows of the RSM are to be found worldwide.

Benefits include:

- Conferences, symposia, seminars, courses over 350 meetings held each year
- 40 specialty Sections and 12 interdisciplinary Forums – including Sections of Epidemiology & Public Health and Comparative Medicine
- One of the foremost medical libraries in Europe 500,000 books, 2,000 journals and full technical and reader services
- Communication – JRS.M, the Society's academic journal; the RSM Bulletin, with details of all meetings; and RSM News, published quarterly, are mailed to all members worldwide
- Certificate of Fellowship – to announce your affiliation
- Club facilities – superb restaurant, bar, buttery, fitness centre and members' hotel accommodation at half standard London prices

PLEASE SEND ME MEMBERSHIP DETAILS

(Quote ref: F&I)

NAME:

ADDRESS:

.....

PLEASE RETURN TO: THE DEPARTMENT OF EXTERNAL RELATIONS,
THE ROYAL SOCIETY OF MEDICINE, 1 WIMPOLE STREET, LONDON W1M 8AE, UK
Tel: +44 (0) 171-290 2991/2/3 Fax: +44 (0) 171-290 2929

Exploring New Frontiers in the Life Sciences

Protein Science

Published for the Protein Society, **Protein Science** is dedicated to the exploration of all scientific aspects of protein molecules, the 'building blocks of life'. Appearing monthly this innovative journal presents research by leading scientists, encompassing many research settings and methodologies, and cutting across restrictive disciplinary lines. The wide scope of **Protein Science** includes the structure, function and biochemical significance of proteins, their role in molecular and cell biology, genetics and evolution, as well as their regulation and mechanism of action.

Electronic Protein Science

As a leading innovator in scientific publishing technologies, **Protein Science**, now publishing Volume 5, is continually enhancing its electronic dimension. For 1996, it will have on-line text and graphics, providing faster publication and greater access to original proteins research.

Members of The Protein Society have access to the 1996 electronic edition without additional charge.

Features

- Full length original research papers & shorter contributions
- On the Record – concise reports of recent developments
- Recollective series – significant discoveries & how they influenced the subsequent course of scientific pursuits are recalled
- Rapid publications
- Lists of forthcoming papers
- Corporate members news
- Calendars of meetings

Subscription Information

Volume 5, 1996 monthly with 12 diskettes: £415/\$705; £125/\$195 for individuals. Subscription price includes airmail/airspeeded delivery. All members of The Protein Society will receive **Protein Science** as part of their membership.

For information via the Internet contact:
<http://www.prosci.uci.edu>

For further information or a free sample copy, write to: Journals Marketing Department, Cambridge University Press, The Edinburgh Building, *FREEPOST, Cambridge, CB1 2BR, UK
Tel: +44 (0)1223 325806
Fax: +44 (0)1223 315052
Email: journals_marketing@cup.cam.ac.uk

In USA, Canada & Mexico write to:
Cambridge University Press, 40 West
20th Street, New York, NY 10011, USA



CAMBRIDGE
UNIVERSITY PRESS

Epidemiology and Infection

Original reports and reviews on all aspects of infection of man and animals

CONTENTS

Special Article. Virology research and virulent human pandemics	
Mims, C. A.	377
A cluster of cases of streptococcal necrotizing fasciitis in Gloucestershire	
Cartwright, K., Logan, M., McNulty, C., Harrison, S., George, R., Efstratiou, A., McEvoy, M. and Begg, N.	387
Epidemiological investigation of an outbreak of meningococcal meningitis in Makkah (Mecca), Saudi Arabia, 1992	
Al-Gahtani, Y. M., El Bushra, H. E., Al-Qarawi, S. M., Al-Zubaidi, A. A. and Fontaine, R. E.	399
Targeted vaccination with meningococcal polysaccharide vaccine in one district of the Czech Republic	
Kriz, P., Vlckova, J. and Bobak, M.	411
Analysis of methicillin-resistant and methicillin-susceptible <i>Staphylococcus aureus</i> by a molecular typing method based on coagulase gene polymorphisms	
Kobayashi, N., Taniguchi, K., Kojima, K., Urasawa, S., Uehara, N., Omizu, Y., Kishi, Y., Yagihashi, A. and Kurokawa, I.	419
Biotype traits and antibiotic susceptibility of <i>Vibrio cholerae</i> serogroup O1 before, during and after the emergence of the O139 serogroup	
Mukhopadhyay, A. K., Garg, S., Balakrish Nair, G., Kar, S., Ghosh, R. K., Pajni, S., Ghosh, A., Shimada, T., Takeda, T. and Takeda, Y.	427
An epidemiological study of <i>Vibrio cholerae</i> O1 in the Australian environment based on rRNA gene polymorphisms	
Desmarchelier, P. M., Wong, F. Y. K. and Mallard, K.	435
The role of heightened surveillance in an outbreak of <i>Escherichia coli</i> O157. H7	
Roberts, C. L., Mshar, P. A., Carter, M. L., Hadler, J. L., Sosin, D. M., Hayes, P. S. and Barrett, T. J.	447
Isolation of enterotoxigenic <i>Escherichia coli</i> from British troops in Saudi Arabia	
Willshaw, G. A., Cheasty, T., Rowe, B., Smith, H. R., Faithfull-Davies, D. N. and Brooks, T. G. J.	455
Adhesion of <i>Aeromonas</i> sp. to cell lines used as models for intestinal adhesion	
Kirov, S. M., Hayward, L. J. and Nerrie, M. A.	465
Antibiotic susceptibility of campylobacter isolates from sewage and poultry abattoir drain water	
Koenraad, P. M. F. J., Jacobs-Reitsma, W. F., Van der Laan, T., Beumer, R. R. and Rombouts, F. M.	475
The speciation and subtyping of campylobacter isolates from sewage plants and waste water from a connected poultry abattoir using molecular techniques	
Koenraad, P. M. F. J., Ayling, R., Hazleger, W. C., Rombouts, F. M. and Newell, D. G.	485
Effect of changes in processing to improve hygiene control on contamination of poultry carcasses with campylobacter	
Mead, G. C., Hudson, W. R. and Hinton, M. H.	495

continued inside back cover

CAMBRIDGE
UNIVERSITY PRESS



0950-2688(199512)115:3;1-Q