anses
agence nationale de sécurité sanitaire
alimentation, environnement, travail

Connaître, évaluer, protéger

Quelle corrélation entre la consommation d'antibiotiques et la transmission des résistances animal-Homme ?

Jean-Yves MADEC

Directeur de recherches

Chef du pôle Antibiorésistance de l'Anses

jean-yves.madec@anses.fr

17 novembre 2015

Ministère des affaires sociales, de la santé et des droits des femmes

La résistance aux antibiotiques devient une menace à l'échelle mondiale

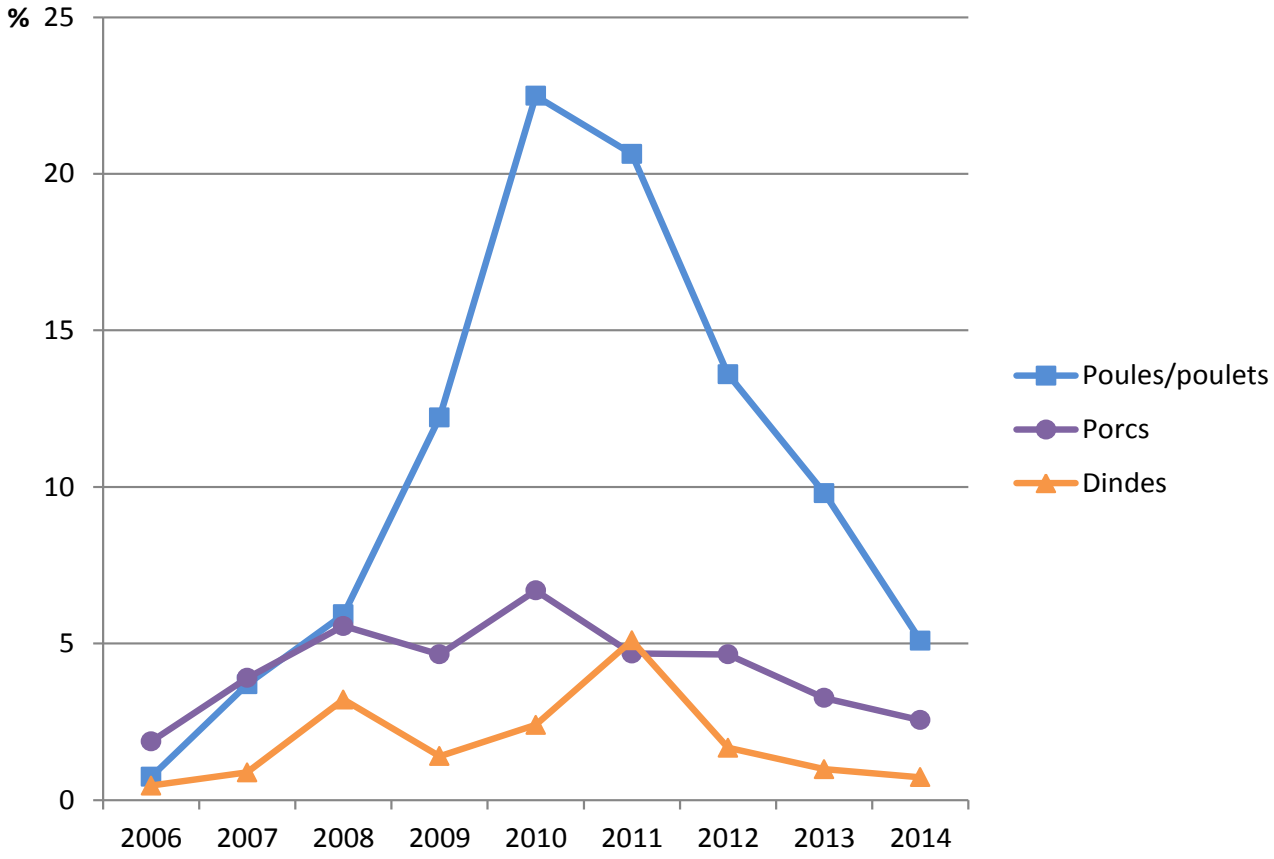
Selon l'OMS, des infections courantes et des blessures mineures pourra

Résistance aux antibiotiques L'OMS tire le signal d'alarme

La résistance aux antibiotiques est devenue une réalité à laquelle aucune région du monde n'échappe. Demain, des infections banales et des blessures légères, soignées depuis des décennies, pourraient redevenir mortelles. Dans son premier rapport sur cette problématique publié mercredi 30 avril, l'Organisation mon-

Le Monde 5 mai 2014

Ceftiofur (*E. coli*)



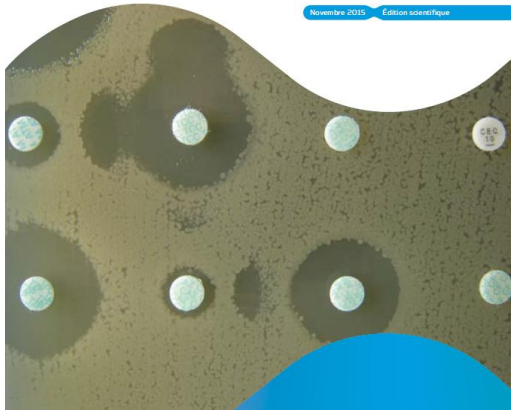
anses

Résapath

Réseau d'épidémiosurveillance de l'antibiorésistance des bactéries pathogènes animales

Bilan 2014

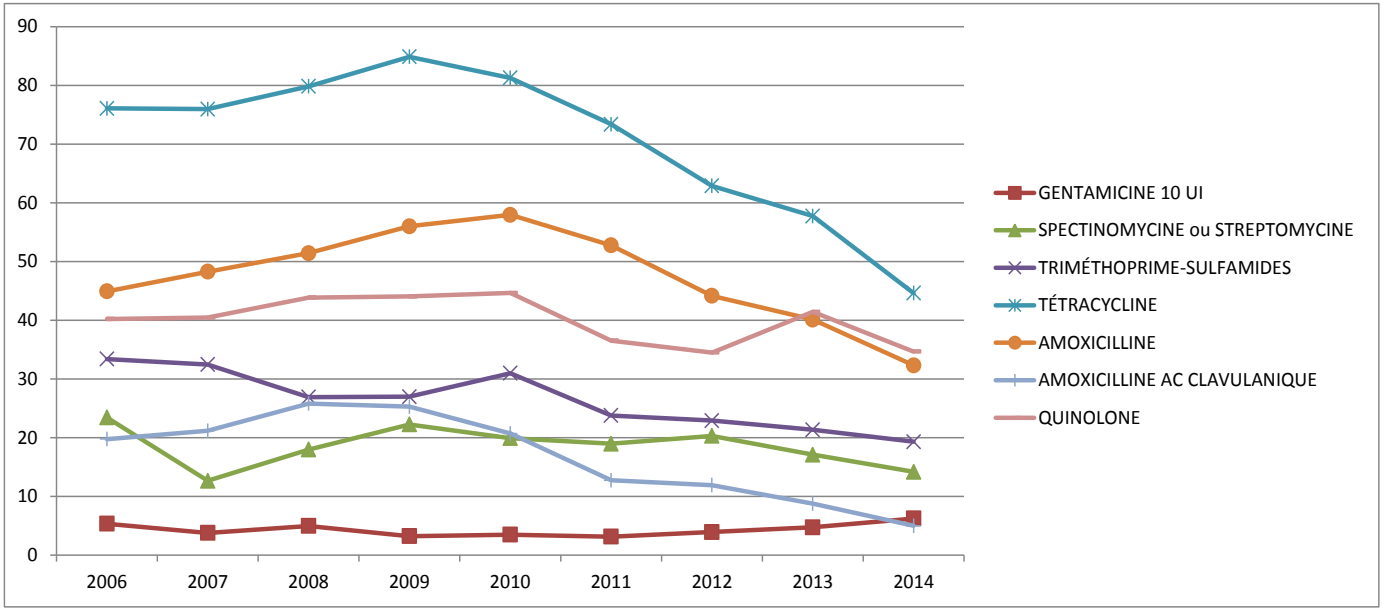
Novembre 2015 Édition scientifique



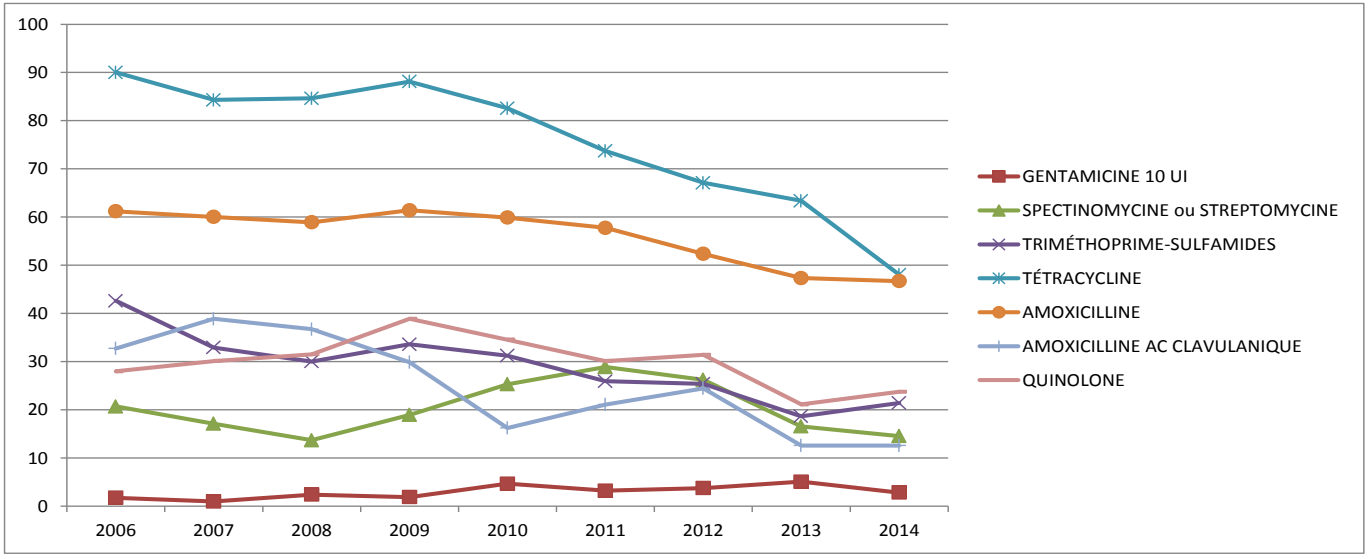
ONERBA France

écoantibio2017

Réduire l'utilisation des antibiotiques vétérinaires : diminuer, c'est possible

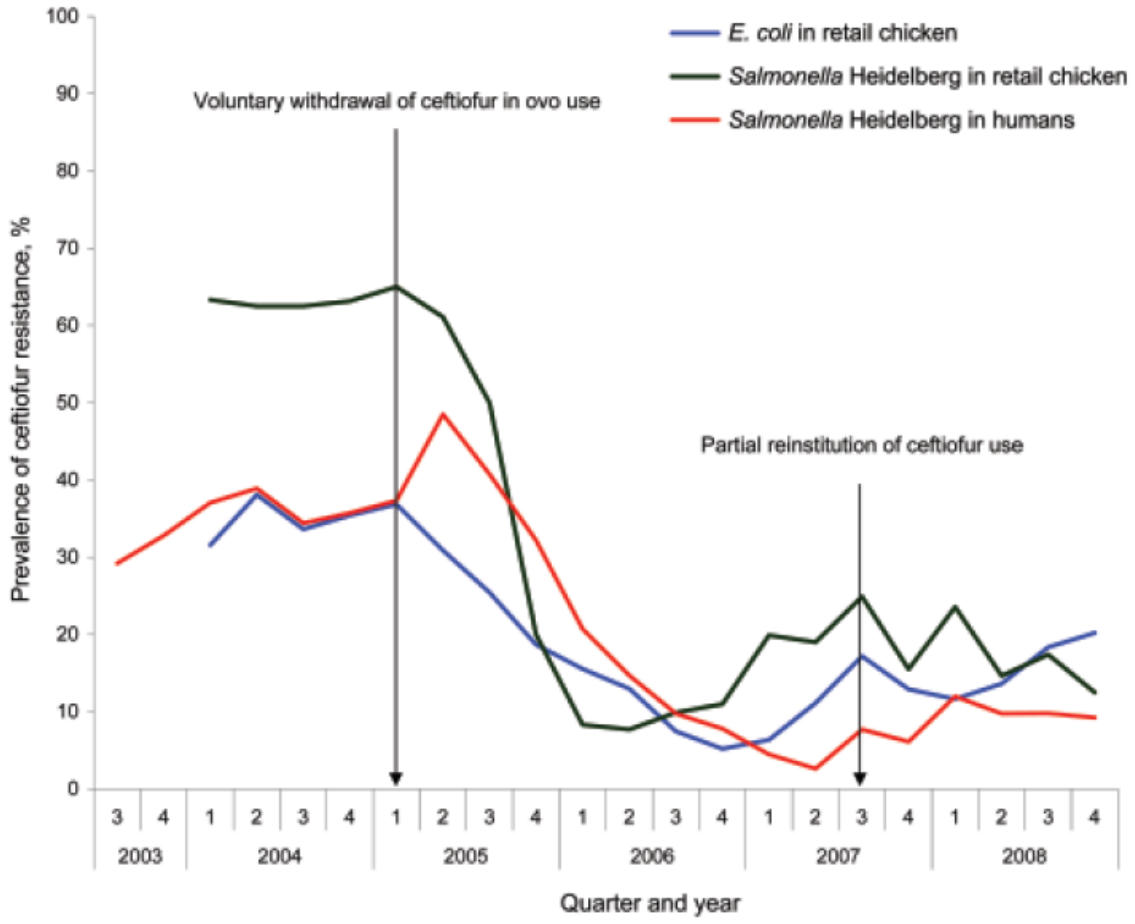


Poules poulets



Dindes

Lien entre usage et résistance



Ceftiofur Resistance in *Salmonella enterica* Serovar Heidelberg from Chicken Meat and Humans, Canada

Lucie Dutil, Rebecca Irwin, Rita Finley, Lai King Ng, Brent Avery, Patrick Boerlin, Anne-Marie Bourgault, Linda Cole, Danielle Daignault, Andrea Desruisseau, Walter Demczuk, Linda Hoang, Greg B. Horsman, Johanne Ismail, Frances Jamieson, Anne Maki, Ana Pacagnella, and Dylan R. Pillai

Lien entre usage et transmission

1. Niveau d’analyse global

Probablement

2. Echelle des expositions spécifiques

Pas forcément

On trouve de la résistance partout !

Characterization and Comparison of Extended-Spectrum β-Lactamase (ESBL) Resistance Genotypes and Population Structure of *Escherichia coli* Isolated from Franklin's Gulls (*Leucophaeus pipixcan*) and Humans in Chile

Jorge Hernandez[1¶], Anders Johansson[2¶], Johan Stedt[3], Stina Bengtsson[4], Aleksandra Porczak[4], Susanne Granholm[2], Daniel González-Acuña[5], Björn Olsen[1], Jonas Bonnedahl[3,6¤], Mirva Drobni[1]

Escherichia coli

Detection of Extended-Spectrum Beta-Lactamase (ESBL)-Producing *Escherichia coli* on Flies at Poultry Farms

Hetty Blaak, Raditijo A. Hamidjaja, Angela H. A. M. van Hoek, Lianne de Heer, Ana Maria de Roda Husman, Franciska M. Schets
National Institute for Public Health and the Environment (RIVM), Laboratory for Zoonoses and Environmental Microbiology, BA Bilthoven, The Netherlands

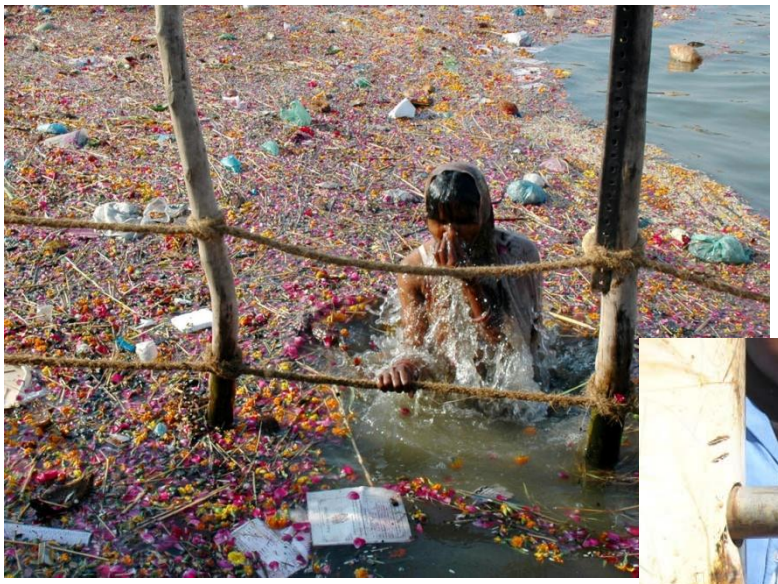
frontiers in MICROBIOLOGY

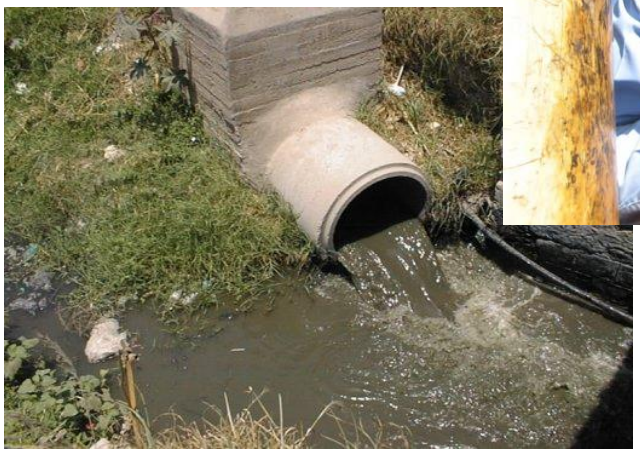
ORIGINAL RESEARCH ARTICLE
published: 09 March 2012
doi: 10.3389/fmicb.2012.00083

Occurrence of CTX-M producing *Escherichia coli* in soils, cattle, and farm environment in France (Burgundy region)

Alain Hartmann[1,2], Aude Locatelli[1], Lucie Amoureux[3], Géraldine Depret[1,2], Claudy Jolivet[4], Eric Gueneau[5] and Catherine Neuwirth[3]*

L’eau est un risque majeur de dissémination des antibiotiques et de la résistance





La plupart des antibiotiques persistent dans les sols et les effluents

Antibiotics	Dégradation %	Days
Chlortétracycline	24	84
Tétracycline	50	48
Oxytetracycline	0	180
Ceftiofur	6	1
Sulfonamides	0	28
Aminoglycosides	0	30
Tiamulin	50	26
Tylosin	50	2
Bacitracin	77	30
Enrofloxacin	<1	56

*(courtesy **P.-L.Toutain**)*

Désinfectants / Biocides et antibiorésistance

frontiers in MICROBIOLOGY

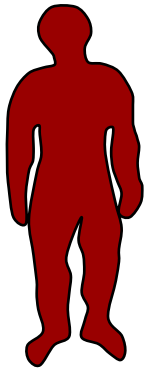
REVIEW ARTICLE
published: 15 January 2015
doi: 10.3389/fmicb.2014.00780

The impact of triclosan on the spread of antibiotic resistance in the environment

Daniel E. Carey and Patrick J. McNamara*

Department of Civil, Construction and Environmental Engineering, Marquette University, Milwaukee, WI, USA

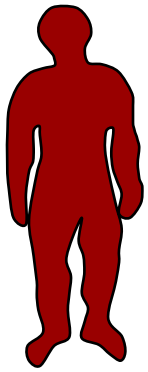
Histoires de plasmides BLSE entre Homme, animaux et environnement



Hôpital

CTX-M-15/IncI1/ST31

E. coli
O104:H4



Veaux en ferme

Non-ST131 *Escherichia coli* from cattle harbouring human-like *bla*$_{CTX-M-15}$-carrying plasmids

Jean-Yves Madec[1]*, Laurent Poirel[2], Estelle Saras[1], Aurore Gourguechon[1], Delphine Girlich[2], Patrice Nordmann[2] and Marisa Haenni[1]

Un plasmide plutôt animal CTX-M-1/IncI1/ST3

J Antimicrob Chemother
doi:10.1093/jac/dks308

IncI1/ST3 plasmids contribute to the dissemination of the *bla*$_{CTX-M-1}$ gene in *Escherichia coli* from several animal species in France

Safia Dahmen, Marisa Haenni and Jean-Yves Madec*

JAC 2012

J Antimicrob Chemother
doi:10.1093/jac/dkt258

The *bla*$_{CTX-M-1}$ IncI1/ST3 plasmid is dominant in chickens and pets in Tunisia

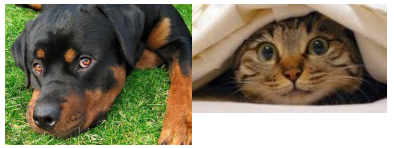
Raoudha Grami[1,2], Wejdene Mansour[2], Safia Dahmen[1], Wahib Mehri[3], Marisa Haenni[1], Mahjoub Aouni[2] and Jean-Yves Madec[1]*

JAC 2013

AAC
Journals.ASM.org

High Prevalence of *bla*$_{CTX-M-1}$/IncI1/ST3 and *bla*$_{CMY-2}$/IncI1/ST2 Plasmids in Healthy Urban Dogs in France

Marisa Haenni,[a] Estelle Saras,[a] Véronique Métayer,[a] Christine Médaille,[b] Jean-Yves Madec[a]
Agence Nationale de Sécurité Sanitaire, Unité Antibiorésistance et Virulence Bactériennes, Lyon, France[a]; Vebio, Laboratoire d'Analyses Vétérinaires, Arcueil, France[b]



AAC 2014

CTX-M-1/IncI1/ST3 chez l'Homme

TABLE 1 Plasmids types and subtypes carried by the 48 *E. coli* isolates included in the study

Isolate source	Study reference	No. of $bla_{CTX-M-1}$-carrying plasmids ($n = 48$)						
		IncI1						
		ST3	ST7	ST35	ST157	NT[a]	IncF	NT
Clinical cases ($n = 35$)	8	21	5	0	0	1	1	7
Healthy day care center children ($n = 7$)	7	6	0	1	0	0	0	0
Healthy adults ($n = 6$)	9	5	0	0	1	0	0	0
Total ($n = 48$)		32	5	1	1	1	1	7

[a] NT, not typeable.

CTX-M-1 chez l'Homme :
26% des BLSE de portage enfants (7)
24% des BLSE cliniques (hôpital) (8)
Même prévalence que CTX-M-15 chez les sujets sains (9)

High Prevalence of the Animal-Associated $bla_{CTX-M-1}$ IncI1/ST3 Plasmid in Human *Escherichia coli* Isolates

Jean-Yves Madec,[a] Marisa Haenni,[a] Véronique Métayer,[a] Estelle Saras,[a] Marie-Hélène Nicolas-Chanoine[b,c,d]

Unité Antibiorésistance et Virulence Bactériennes, ANSES Site de Lyon, Lyon, France[a]; Hôpital Beaujon, AP-HP, Clichy, France[b]; Faculté de Médecine D. Diderot, Université Paris VII, Paris, France[c]; INSERM UMR 1149, Université Paris VII, Paris, France[d]

AAC 2015

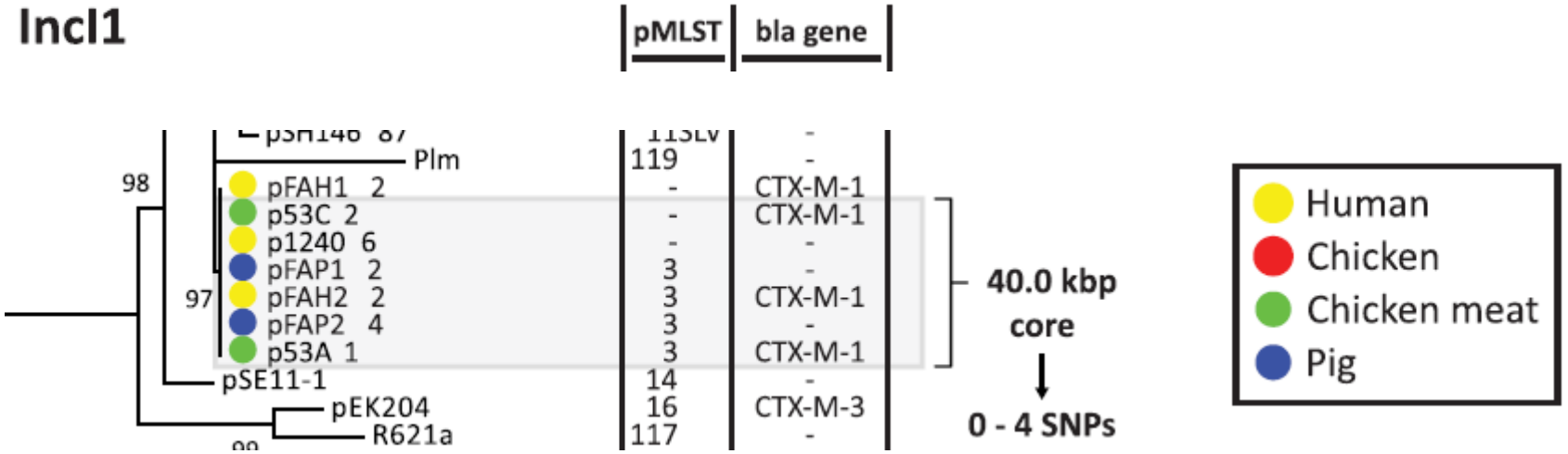
OPEN ACCESS Freely available online

PLOS | GENETICS

Dissemination of Cephalosporin Resistance Genes between *Escherichia coli* Strains from Farm Animals and Humans by Specific Plasmid Lineages

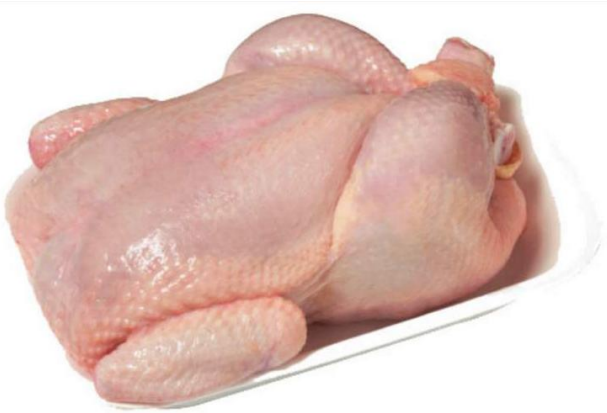
Mark de Been[1☯*], Val F. Lanza[2☯], María de Toro[2], Jelle Scharringa[1], Wietske Dohmen[3], Yu Du[4], Juan Hu[4], Ying Lei[4], Ning Li[5], Ave Tooming-Klunderud[6], Dick J. J. Heederik[3], Ad C. Fluit[1], Marc J. M. Bonten[1], Rob J. L. Willems[1], Fernando de la Cruz[2*], Willem van Schaik[1]

CTX-M-1/IncI1/ST3



sequencing data were validated by long-read DNA sequencing for two strains. Our findings failed to demonstrate evidence for recent clonal transmission of cephalosporin-resistant *E. coli* strains from poultry to humans, as has been suggested based on traditional, low-resolution typing methods. Instead, our data suggest that cephalosporin resistance genes are mainly disseminated in animals and humans via distinct plasmids.

Viande au détail
Résistance aux C3G : 43,9%



High prevalence of extended-spectrum-β-lactamase-producing Enterobacteriaceae in organic and conventional retail chicken meat, Germany

Methods: A total of 399 chicken meat samples from nine supermarket chains, four organic food stores and one butcher's shop in two geographically distinct regions (Berlin and Greifswald) were screened for ESBL production using selective agar. Phenotypic ESBL isolates were tested for bla_{TEM}, $bla_{CTX\text{-}M}$ and bla_{SHV} genes using PCR and DNA sequencing. Antibiotic coresistances were determined and strain typing was performed using PCR-based phylogenetic grouping and XbaI-PFGE.

Results: A total of 185 confirmed ESBL isolates were obtained from 175 samples (43.9%) from all tested sources. The majority of isolates were *Escherichia coli* producing ESBL types SHV-12 ($n=82$), CTX-M-1 ($n=77$) and TEM-52 ($n=16$). No differences could be observed in the prevalence of ESBL producers between organic and conventional samples. 73.0% of the ESBL producers showed coresistance to tetracycline, 35.7% to co-trimoxazole and 7.6% to ciprofloxacin. Strain typing of selected *E. coli* isolates from Berlin revealed identical macrorestriction patterns for several isolates from samples taken from the same stores.

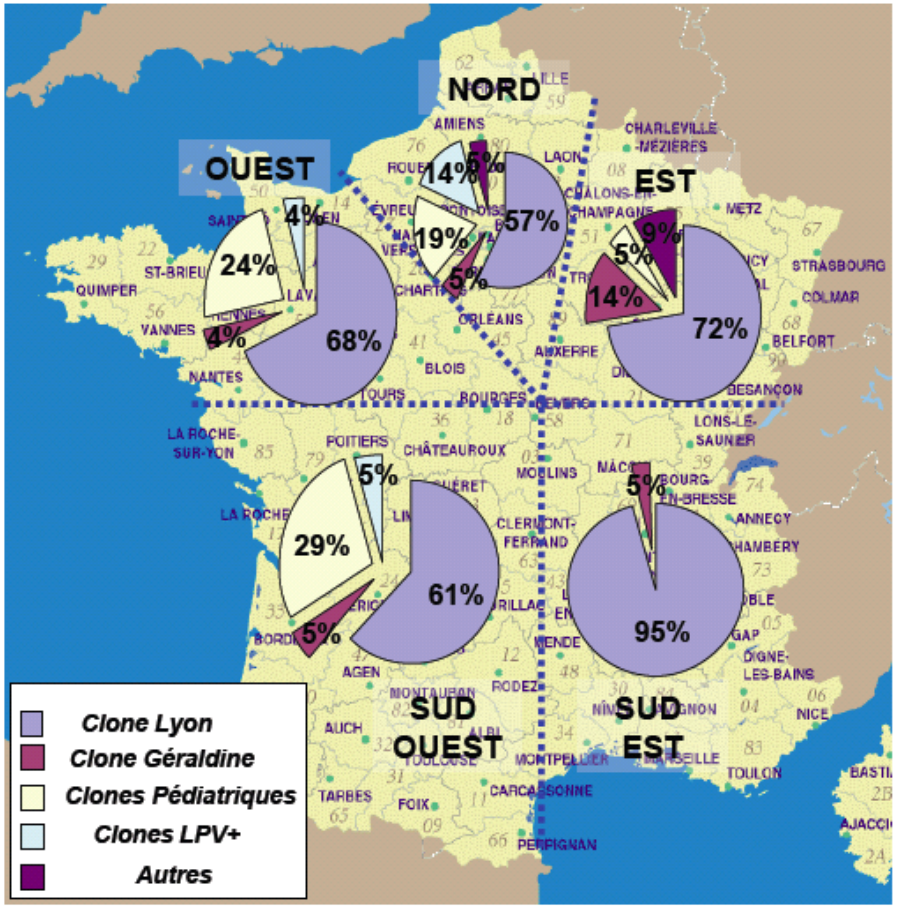
Lien entre usage et transmission

1. Niveau d'analyse global

Probablement

2. Echelle des expositions spécifiques

Pas forcément



MRSA Epidemiology at Hospital

(courtesy NRC – Vandenesch F)

stant *Staphylococcus aureus* (MRSA)
Present in Midwestern U.S. Swine and

Male[1,2], Abby L. Harper[1,2], Jennifer S. Kroeger[3], Gregory P. Tinkler[2], Erin D.
[2], Loreen A. Herwaldt[1,3,4], Daniel J. Diekema[3,4,5]

slaughterhouse workers in

. ZÜCHNER, B. H. B. VAN BENTHEM, J. A. J. W.

SARM humains chez le chien

A USA300 variant and other human-related methicillin-resistant *Staphylococcus aureus* strains infecting cats and dogs in France

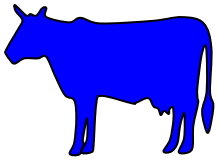
Marisa Haenni[1]*, Estelle Saras[1], Pierre Châtre[1], Christine Médaille[2], Michèle Bes[3,4], Jean-Yves Madec[1] and Frédéric Laurent[3,4]

MRSP du chien chez l'Homme

J Antimicrob Chemother 2010
doi:10.1093/jac/dkq241
Advance publication 1 July 2010

Human infection associated with methicillin-resistant *Staphylococcus pseudintermedius* ST71

Ramona Stegmann[1], André Burnens[2], Christian A. Maranta[3] and Vincent Perreten[1]*



The emergence of *mecC* methicillin-resistant *Staphylococcus aureus*

Gavin K. Paterson, Ewan M. Harrison, and Mark A. Holmes

Meticillin-resistant *Staphylococcus aureus* with a novel *mecA* homologue in human and bovine populations in the UK and Denmark: a descriptive study

Laura García-Álvarez, Matthew T G Holden, Heather Lindsay, Cerian R Webb, Derek F J Brown, Martin D Curran, Enid Walpole, Karen Brooks, Derek J Pickard, Christopher Teale, Julian Parkhill, Stephen D Bentley, Giles F Edwards, E Kirsty Girvan, Angela M Kearns, Bruno Pichon, Robert L R Hill, Anders Rhod Larsen, Robert L Skov, Sharon J Peacock, Duncan J Maskell, Mark A Holmes

www.thelancet.com/infection Published online June 3, 2011 DOI:10.1016/S1473-3099(11)70126-8

New strain of MRSA superbug may have spread from cattle to humans

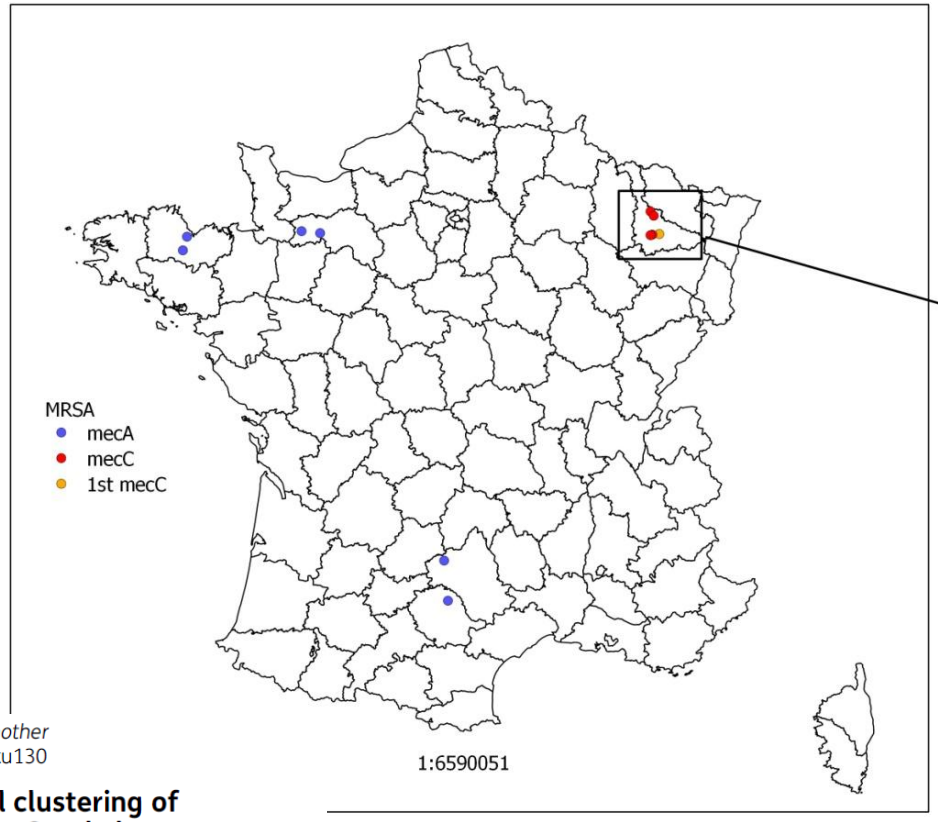
Newly discovered MRSA strain found in cattle on 3% of dairy farms in the UK and caused 12 infections in people last year

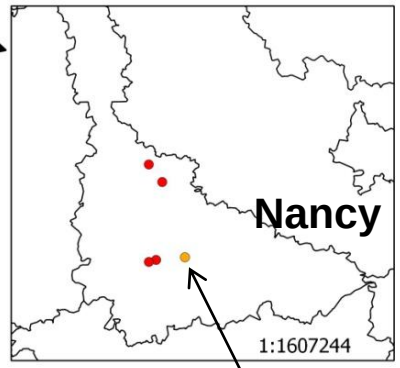
Ian Sample, science correspondent
The Guardian, Friday 3 June 2011

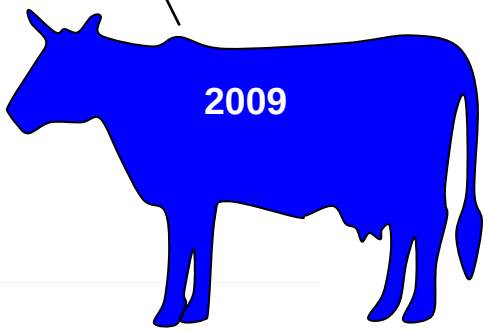
mecC chez les bovins en France

MRSA Harboring *mecA* Variant Gene *mecC*, France

Frederic Laurent, Hubert Chardon,
Marisa Haenni, Michele Bes,
Marie-Elisabeth Reverdy, Jean-Yves Madec,
Evelyne Lagier, François Vandenesch,
and Anne Tristan







J Antimicrob Chemother
doi:10.1093/jac/dku130

Geographical clustering of *mecC*-positive *Staphylococcus aureus* from bovine mastitis in France

Marisa Haenni[1]*, Pierre Châtre[1], Jason Tasse[2,3], Nathalie Nowak[4], Michèle Bes[2,3], Jean-Yves Madec[1] and Frédéric Laurent[2,3]

JAC 2014

Pas que chez les bovins !

Hommes – CC130, CC425, CC1943

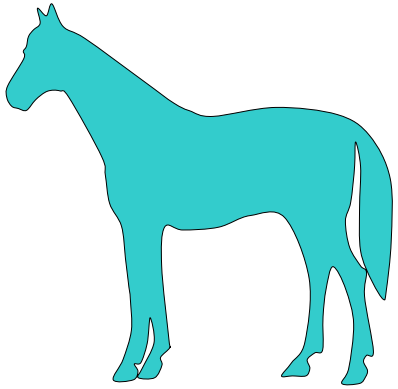
Vaches – CC130, CC425
Moutons – CC130

Chiens – CC599
Lapins – ST425
Chats – CC130, CC599
Cochons d’Inde – CC130

Chevaux – CC130

Phoques – CC130
Cerfs – CC130
Pinson – CC130
Rats – CC130, CC49

4 ans avant de le trouver chez le cheval …



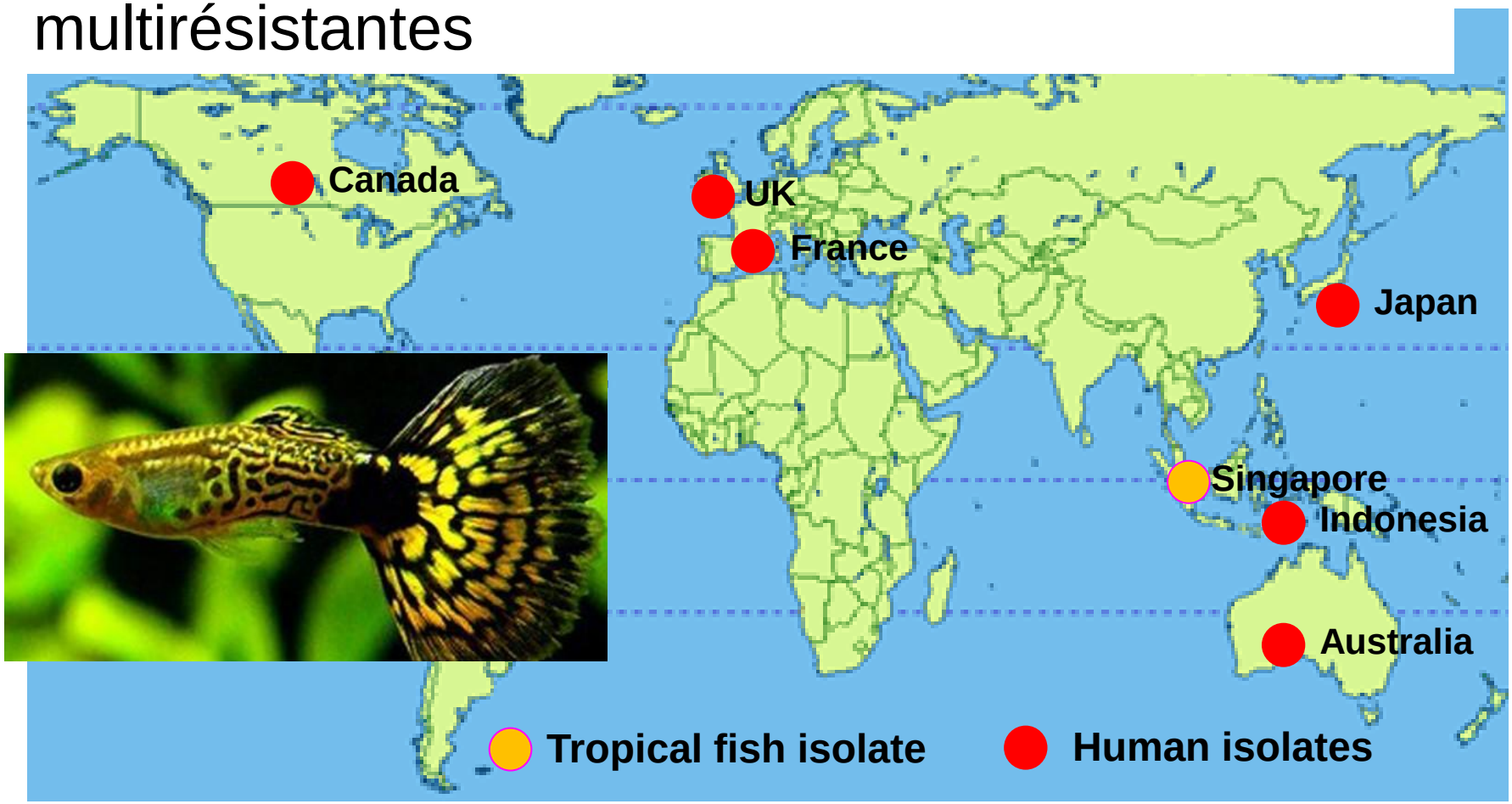
J Antimicrob Chemother
doi:10.1093/jac/dkv278

mecC-positive MRSA in horses

Marisa Haenni[1]*, Pierre Châtre[1], Céline Dupieux[2,3], Véronique Métayer[1], Karine Maillard[4], Michèle Bes[2,3], Jean-Yves Madec[1] and Frédéric Laurent[2,3]

JAC 2015

Poissons tropicaux et *Salmonella* Paratyphi B multirésistantes



(courtesy Axel Cloeckaert)

Levings *et al*. (2006). Emerg Infect Dis. 12:507-510

J Antimicrob Chemother 2014; **69**: 977–981
doi:10.1093/jac/dkt469 Advance Access publication 27 November 2013

Journal of Antimicrobial Chemotherapy

Resistance to third-generation cephalosporins in human non-typhoidal *Salmonella enterica* isolates from England and Wales, 2010–12

Liam Burke[1]*, Katie L. Hopkins[2], Daniele Meunier[2], Elizabeth de Pinna[3], Deirdre Fitzgerald-Hughes[1], Hilary Humphreys[1,4] and Neil Woodford[2]

[1]Department of Clinical Microbiology, Royal College of Surgeons in Ireland, Beaumont Hospital, Dublin 9, Ireland; [2]Antimicrobial Resistance and Healthcare Associated Infections Reference Unit (AMRHAI), Public Health England, London, UK; [3]Gastrointestinal Bacteria Reference Unit (GBRU), Public Health England, London, UK; [4]Department of Microbiology, Beaumont Hospital, Dublin 9, Ireland

Conclusions: The prevalence of CTX-M and acquired AmpC genes in human non-typhoidal *S. enterica* from England and Wales is still low, but has increased from 0.03% in 2001–03 to 0.49% in 2010–12. Resistance

Quelle corrélation entre la consommation d'antibiotiques et la transmission des résistances animal-Homme ?

Dimension écologique de la question

Facteurs de risques d'impact majeur