

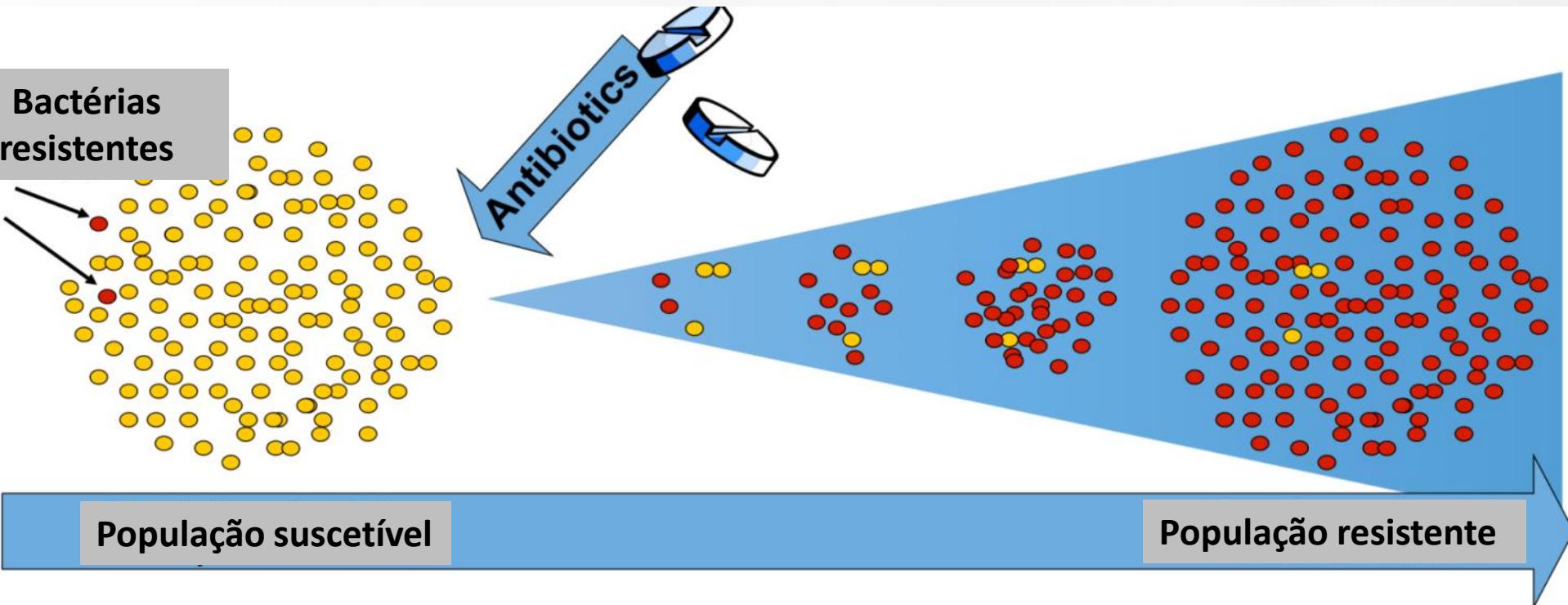
A pesquisa agropecuária aplicada a resistência antimicrobianos: uma ameaça transversal

Jalusa Deon Kich
Raquel Rebelatto

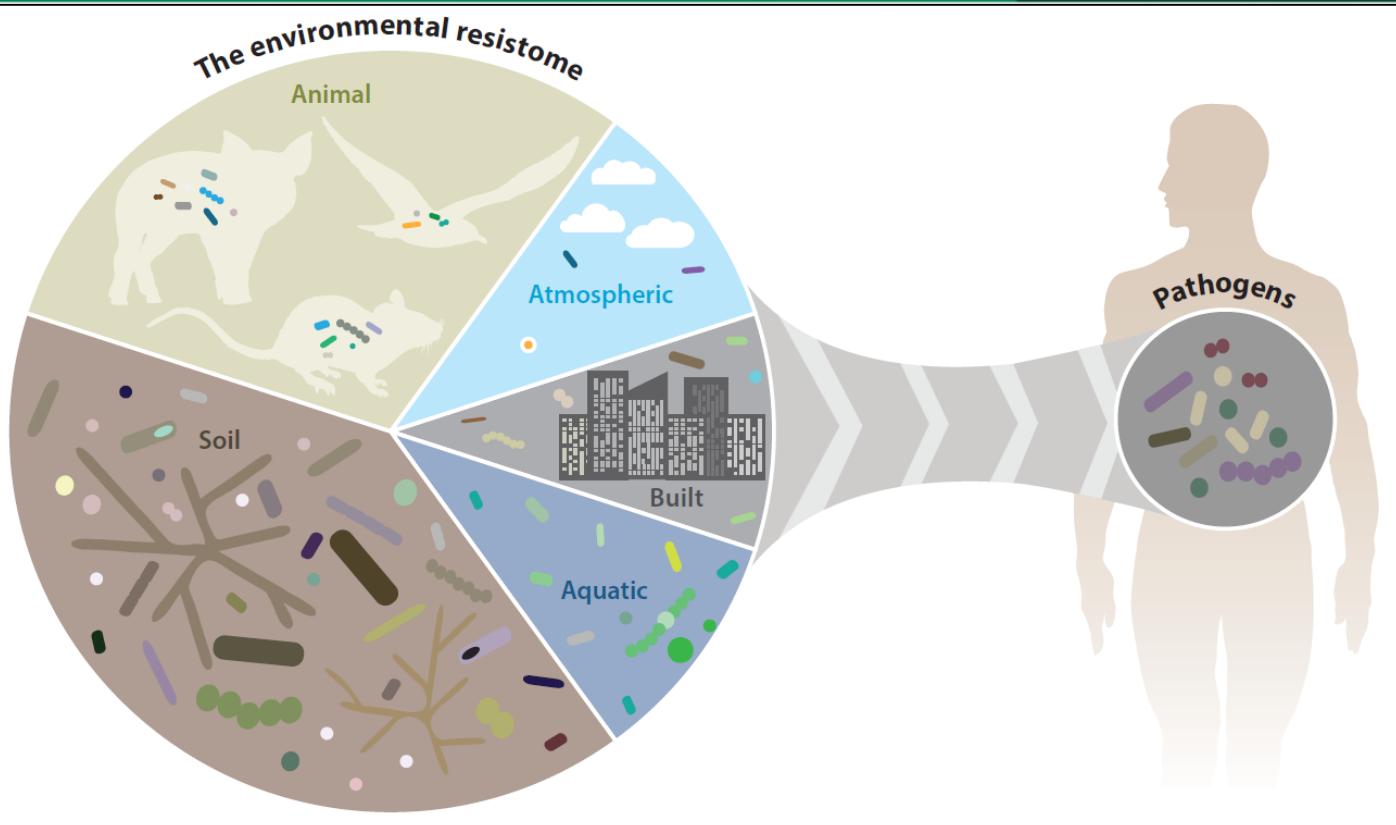


Embrapa

A evolução genética é própria das bactérias há milhões de anos...



Ameaça transversal? reservatório de genes de resistência



AR

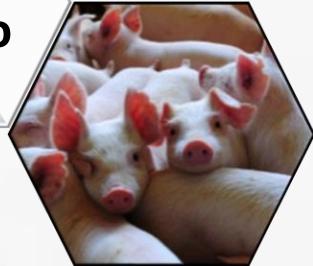
Annual Review of
Microbiology

Volume 71, 2017

Surette e Wright (2017)

Pesquisa agropecuária aplicada a resistência antimicrobiana: abordagem pelo problema

**Clínica
rebanho**



Resíduos



**Clínica
individual**



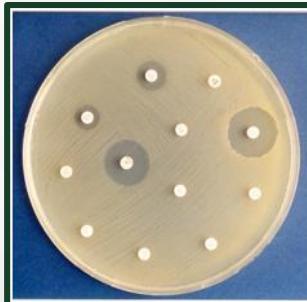
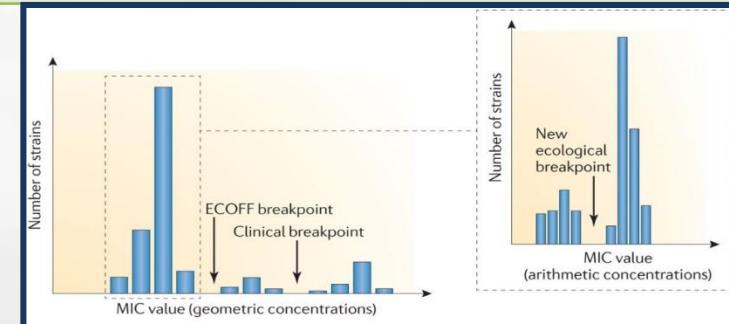
**Ambiente:
contaminantes,
genes de
resistência
microbioma**



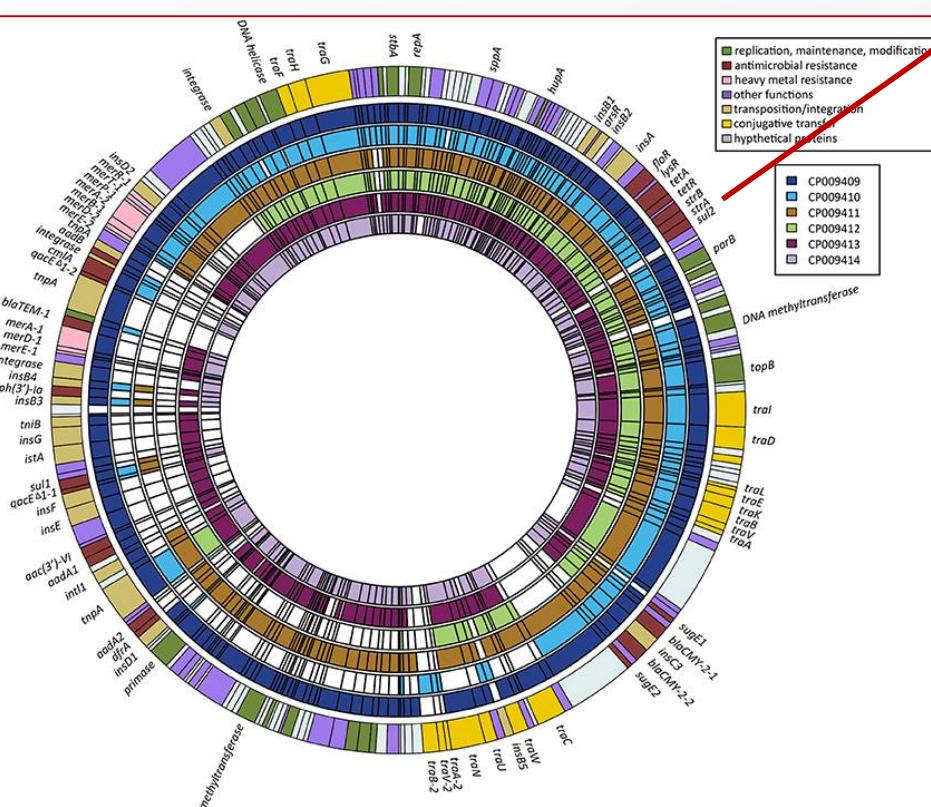
**Saúde Pública
Ocupacional,
DTAs
comensais
resistentes**



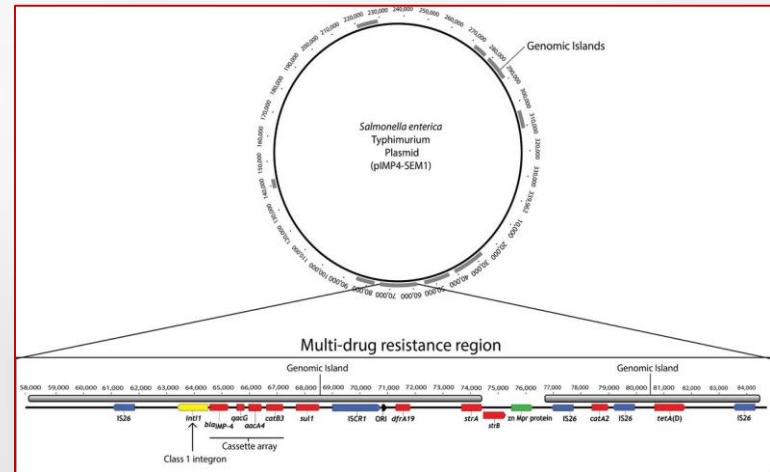
Abordagem metodológica: fenotípica

Antibiograma	Concentração Inibitória mínima
Perfil resistência/sensibilidade dicotômico	Possibilita visão epidemiológica
	 <p>The figure consists of two bar charts. The left chart plots 'Number of Strains' against 'MIC value (geometric concentrations)'. It shows a distribution with a sharp peak at a low MIC value, followed by a long tail of lower counts. Two vertical dashed lines mark the 'ECOFF breakpoint' and the 'Clinical breakpoint'. The right chart plots 'Number of strains' against 'MIC value (arithmetic concentrations)'. It shows a more uniform distribution across a range of MIC values. A vertical dashed line marks the 'New ecological breakpoint', and an arrow points to the 'MIC value' on the x-axis.</p> <p>Nature Reviews Microbiology</p>

Abordagem genotípica



Genes de resistência antimicrobiana



Hoffmann et al, 2017 Frontiers in Microbiology

Problema: Cepas re/multiresistentes causando doença em animais

- 
- **Individual:** bovino de leite, animais de companhia, animais de esporte;
 - **Rebanhos:** suínos, aves, pescados
 - ❖ Perfil de resistência das cepas: relatos
 - ❖ Identificação de determinantes genéticos de resistência: PCR
 - ❖ Monitoramento epidemiológico: Concentração Mínima Inibitória (MIC)

Bovinos de leite Mastite



J. Dairy Sci. 98:1–14

<http://dx.doi.org/10.3168/jds.2014-9137>

© American Dairy Science Association®, 2015.

Phenotypic antimicrobial susceptibility and occurrence of selected resistance genes in gram-positive mastitis pathogens isolated from Wisconsin dairy cows

P. L. Ruegg,¹ L. Oliveira,^{*} W. Jin,[†] and O. Okwumabua[‡]

¹Department of Dairy Science, University of Wisconsin, Madison 53706

[†]School of Veterinary Medicine, Ministry of Education Key Laboratory for Avian Prevention and Control of Diseases, Jiangsu 225009, China

[‡]School of Veterinary Medicine, Wisconsin Veterinary Diagnostic Laboratory, University

DOI: 10.3168/jds.2017v38n4Supl1p2581

***In vitro* antimicrobial susceptibility and genetic resistance determinants of *Streptococcus agalactiae* isolated from mastitis in Brazilian dairy herds**



Susceptibilidade *in vitro* a antimicrobianos e determinantes genéticos de resistência em *Streptococcus agalactiae* isolados de mastite em rebanhos bovinos brasileiros

Juliana Rosa da Silva¹; Gleis dos Anjos de Carvalho Castro²; Maysa Serpa Gonçalves³; Dircéia Aparecida da Costa Custódio⁴; Gláucia Frasnelli Mian⁵; Geraldo Márcio da Costa^{6*}

Clínica na Medicina Veterinária: exemplos

Animais de Companhia e esporte

Contents lists available at ScienceDirect

veterinary
microbiology

Journal of
veterinary
microbiology

—NOTE—

Methicillin-resistant *Staphylococcus aureus* ulcerative keratitis in a Thoroughbred racehorse

Taisuke KURODA¹, Yuta KINOSHITA², Hidekazu NIWA², Fumiaki MIZOBE³, Takanori UENO², Atsutoshi KUWANO¹, Takashi HATAZOE⁴ and Seiji HOBO^{5*}

¹Clinical Science and Pathobiology Division, Equine Research Institute, Japan Racing Association, Tochigi 320-0856, Japan

²Epizootic Research Center, Equine Research Institute, Japan Racing Association, Tochigi 329-0412, Japan

³Racehorse Hospital, Ritto Training Center, Japan Racing Association, Shiga 520-3085, Japan

⁴Kyushu Stallion Station, The Japan Bloodhorse Breeders' Association, Kagoshima 899-8313, Japan

⁵Joint Faculty of Veterinary Medicine, Kagoshima University, Kagoshima 890-0065, Japan

Els M. Broens⁴, Marta Costa⁵, Delphine Criel⁶, Peter Damborg⁷, Marloes A. M. van Dijk⁴, Astrid M. van Dongen⁸, Roswitha Dorsch⁹, Carmen Martin Espada¹⁰, Bernhard Gerber¹¹, Maria Kritispi-Konstantinou¹², Igor Loncaric¹³, Domenico Mion¹⁴, Dusan Misic¹⁵, Rebeca Movilla¹⁶, Gudrun Overesch¹⁷, Vincent Perreten¹⁸, Xavier Roura¹⁶, Joachim Steenbergen⁶, Dorina Timofte^{18,19,20}, Georg Wolf²¹, Renato Giulio Zanoni¹⁴, Sarah Schmitt²², Luca Guardabassi²³ and Constança Pomba^{1*}

I. TUERENA*, N. J. WILLIAMS*, T. NUTTALL¹ AND G. PINCHBECK^{*1}

*Department of Epidemiology and Population Health, Institute of Infection and Global Health, University of Liverpool, Neston, CH64 7TE

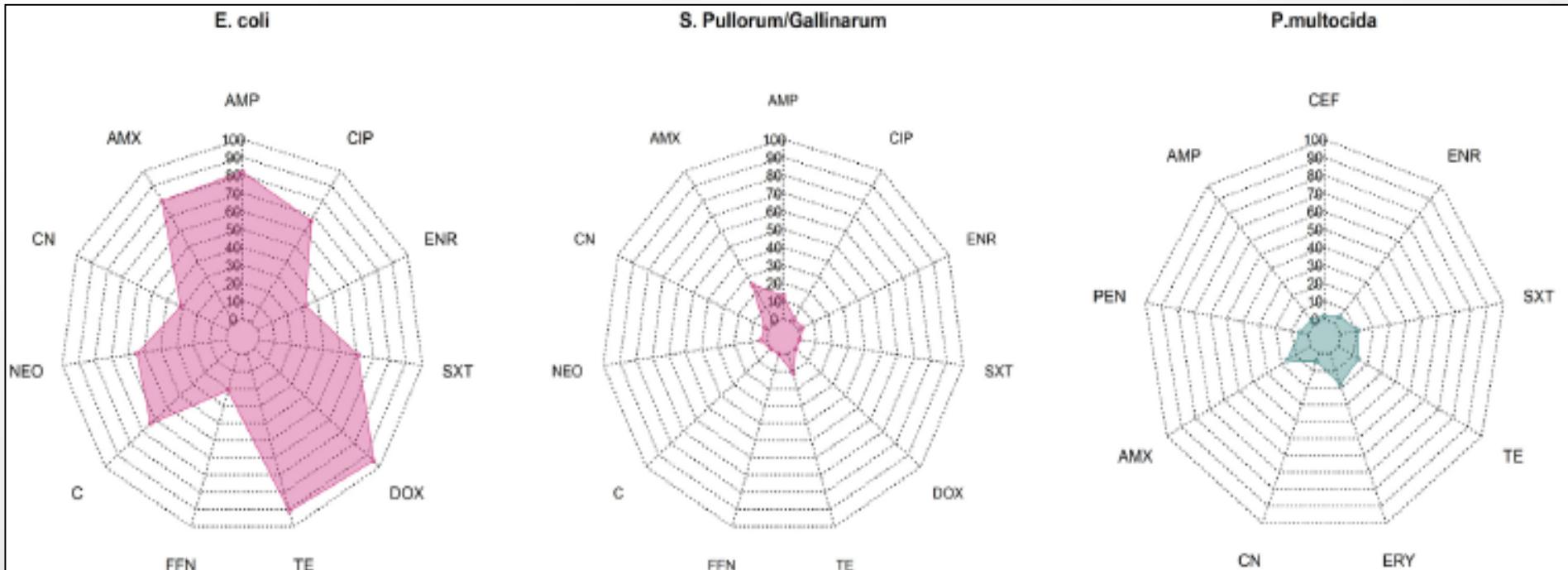
¹School of Veterinary Science, Faculty of Health and Life Sciences, University of Liverpool, Neston, CH64 7TE

^{*}Corresponding author email: Ginap@liv.ac.uk

Clínica de rebanhos: Aves

Antimicrobial Resistance in Bacterial Poultry Pathogens: A Review

Nguyen Thi Nhun¹, Niwat Chansiripornchai² and Juan J. Carriqué-Mas^{1,3*}



AMC amoxicilina / ácido clavulânico; AMP ampicilina; C cloranfenicol; CEF ceftiofur; CIP ciprofloxacin; CN gentamicina; DOX doxiciclina; ENR enrofloxacin; ERY eritromicina; FFN florfenicol; NEO neomicina; PEN penicilina; SXT co-trimoxazol; TE Tetraciclina.

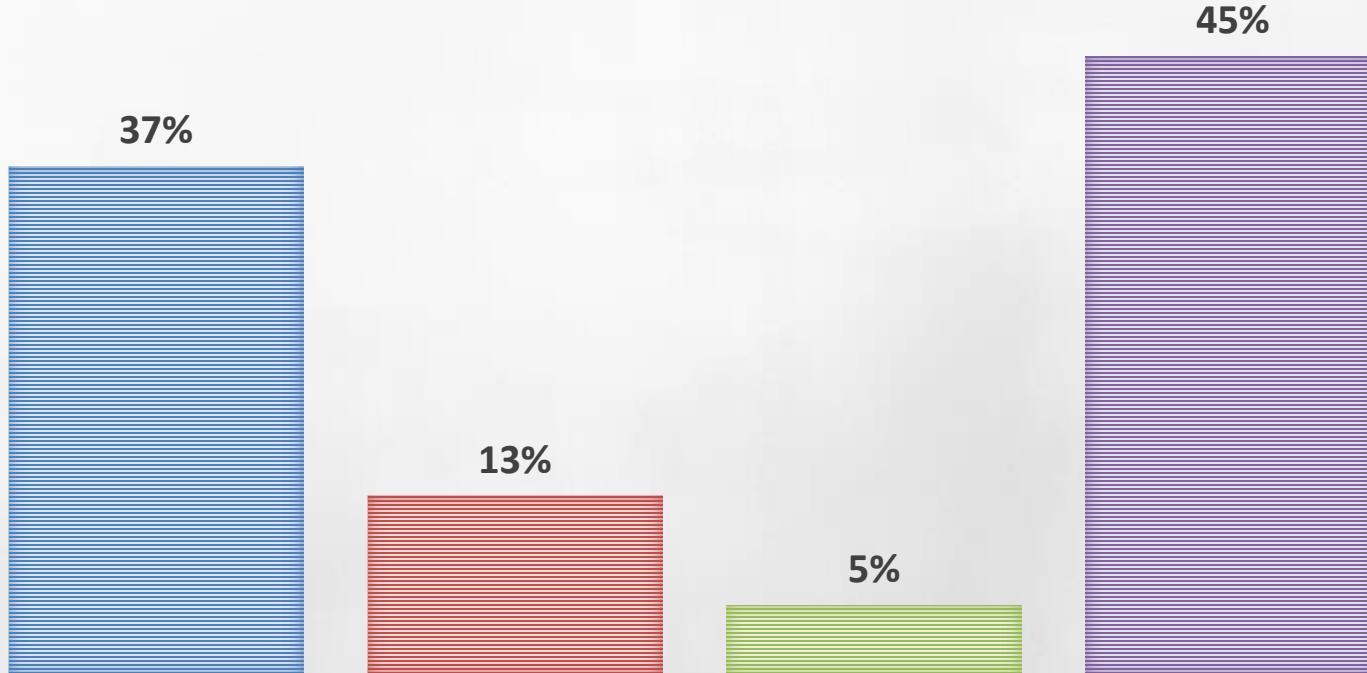
Clínica de rebanhos: Suínos

S. Choleraesuis N 38



■ DOX, STR, FFC, GEN, TET

■ DOX, ENR, STR, FFC, GEN, TET



Clínica de rebanhos: Suínos

S. Typhimurium N 71



- Perfil único
- CIP, DOX, ENR, STR, FFC, GEN, MAR, NOR, SXT, TET
- CIP, DOX, ENR, STR, FFC, GEN, LSC, MAR, NOR, SXT, TET
- CIP, DOX, ENR, STR, FFC, GEN, LSC, MAR, NOR, SXT, TET
- DOX, GEN, TET
- DOX, STR, FFC, GEN, NEO, TET
- DOX, STR, FFC, GEN, TET
- CIP, DOX, ENR, STR, FFC, GEN, LSC, MAR, SXT, TET
- CIP, DOX, ENR, STR, FFC, GEN, MAR, NEO, NOR, SXT, TET
- DOX, ENR, FFC, GEN, MAR, SXT, TET
- DOX, ENR, STR, FFC, GEN, LSC, MAR, SXT, TET
- DOX, TET
- STR, FFC
- STR, FFC, GEN, NEO, TET

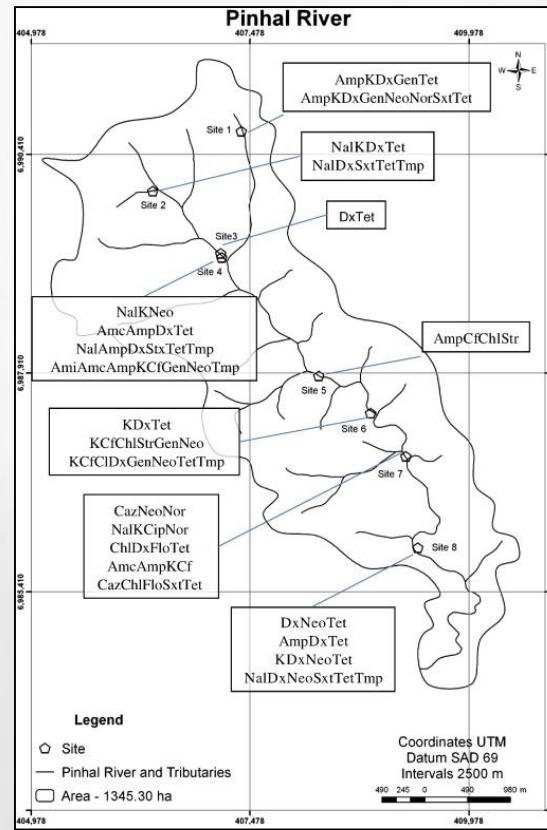
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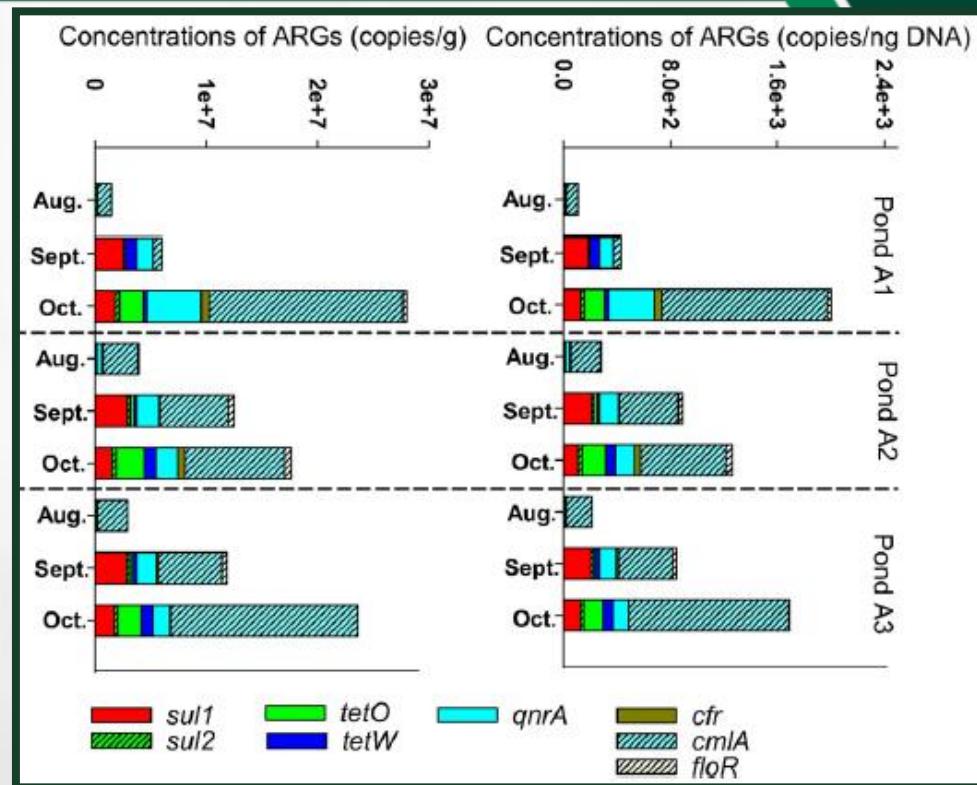
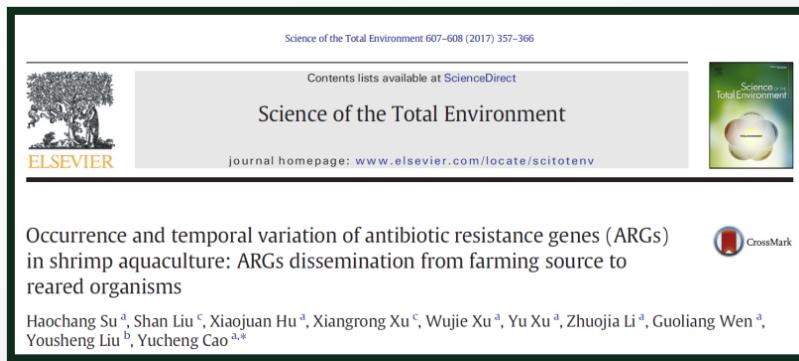
Contaminação ambiental:

- **Contaminação direta com produtos e metabólitos: pesquisa química**
 - ✓ Excreção via urina e fezes
 - ✓ Fertilizantes
 - ✓ Ração, água, dejetos
 - ✓ Descarte de produtos
- **Presença de cepas resistentes / multirresistentes**
- **Presença de genes de resistência**

Pesquisa de bactérias multirresistentes: rio em região produtora



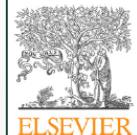
Pesquisa de genes de resistência em Aquicultura



- Ocupacional: Vets/produtores/operários rurais
- Resíduos em POA: leite; carne; ovos
- DTAs: Salmonelose (cepas resistentes *mcr1*); Tuberculose
- Comensais portadoras de genes de resistência:
 - ✓ Plasmídeos/integrons

Saúde pública: exemplos

Ocupacional



Contents lists available at SciVerse ScienceDirect

Veterinary Microbiology

journal homepage: www.elsevier.com/locate/vetmic



Clonal transmission of a rare methicillin-resistant *Staphylococcus aureus* genotype between horses and staff at a veterinary teaching hospital

Mitchell J. Schwaber^a, Shiri Navon-Venezia^a, Samira Masarwa^a, Sharon Tirosh-Levy^b, Amos Adler^a, Inna Chmelnitsky^a, Yehuda Carmeli^a, Eyal Klement^{b,*}, Amir Steinman^{b,*}

^aNational Center for Infection Control, Israel Ministry of Health, 6 Weizmann St., Tel Aviv 64239, Israel

^bKoret School of Veterinary Medicine, The Robert H. Smith Faculty of Agriculture, Food and Environment, The Hebrew University of Jerusalem, POB 12, Rehovot 76100, Israel

Sun et al. *BMC Infectious Diseases* (2017) 17:690
DOI 10.1186/s12879-017-2802-1

BMC Infectious Diseases

RESEARCH ARTICLE

Open Access



CrossMark

Longitudinal study of *Staphylococcus aureus* colonization and infection in a cohort of swine veterinarians in the United States

Jisun Sun¹, My Yang¹, Srinand Sreevatsan¹, Jeffrey B. Bender¹, Randall S. Singer², Todd P. Knutson¹, Douglas G. Marthaler¹ and Peter R. Davies^{1*}

Saúde pública: resíduos em POA



JMBFS

Journal of Microbiology, Biotechnology and Food Sciences

International peer-reviewed scientific online journal

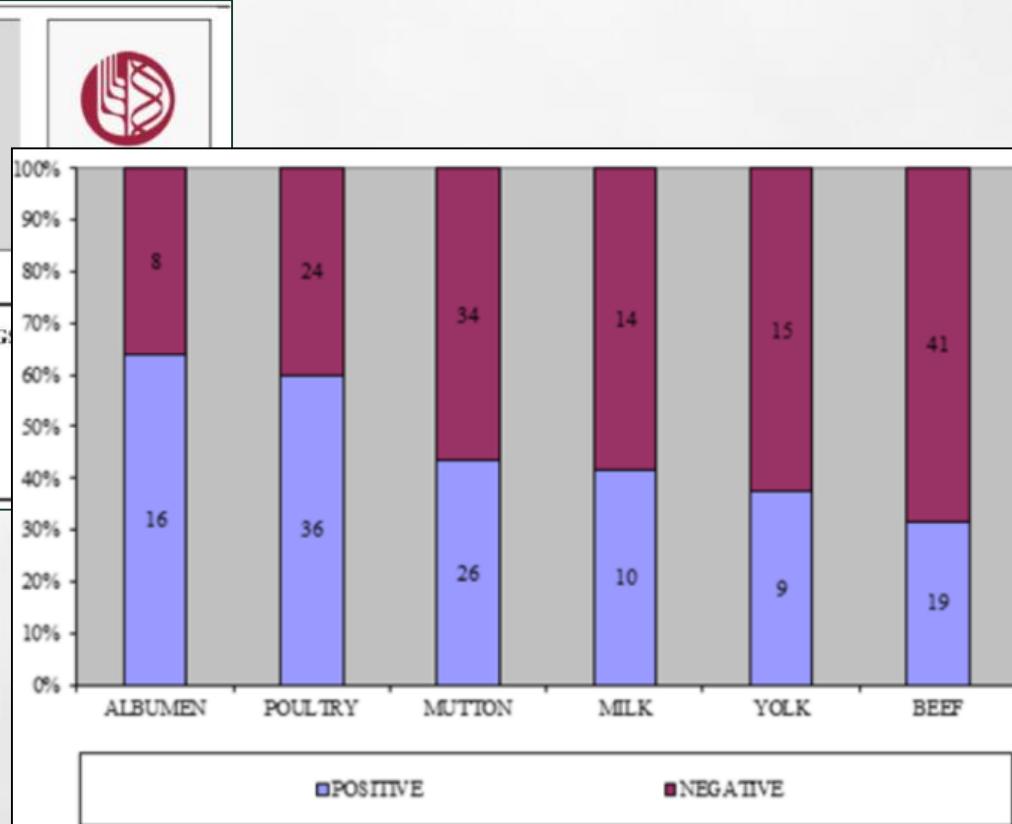
Jabbar et al. 2013 : 2 (5) 2349-2354

MICROBIOLOGICAL EVALUATION OF ANTIBIOTIC RESIDUES IN MEAT, MILK AND EGG

Abdul Jabbar * Sajjad-Ur-Rehman

Address(es): Abdul Jabbar
Institute of Microbiology, University of Agriculture, Faisalabad- 38040, Punjab, Pakistan

*Corresponding author: dr_jabbar@live.com



Saúde pública: Alimentos

ORIGINAL RESEARCH
published: 21 July 2017
doi: 10.3389/fmicb.2017.01344



Detection and Characterization of *Staphylococcus aureus* and Methicillin-Resistant *S. aureus* in Foods Confiscated in EU Borders

David Rodríguez-Lázaro^{1*}, Elena-Alexandra Onilcuc^{1,2}, Patricia G. García³, David Gallego⁴, Isabel Fernández-Natal^{5,6}, Marta Domínguez-Gil⁷, José M. Eltros-Bouza⁷, Martín Wagner⁸, Anca I. Nicolau² and Marta Hernández^{3,9}

SCIENTIFIC REPORTS

OPEN

Distinct mechanisms of acquisition of *mcr-1*-bearing plasmid by *Salmonella* strains recovered from animals and food samples

Received: 7 December 2016
Accepted: 30 March 2017
Published online: 16 October 2017

Mingquan Cui¹, Jinfei Zhang^{2,3}, Chunping Zhang⁴, Ruichao Li^{2,3}, Edward Wai-chi Chan³, Chenbin Wu⁴, Congming Wu¹ & Sheng Chen^{2,3}

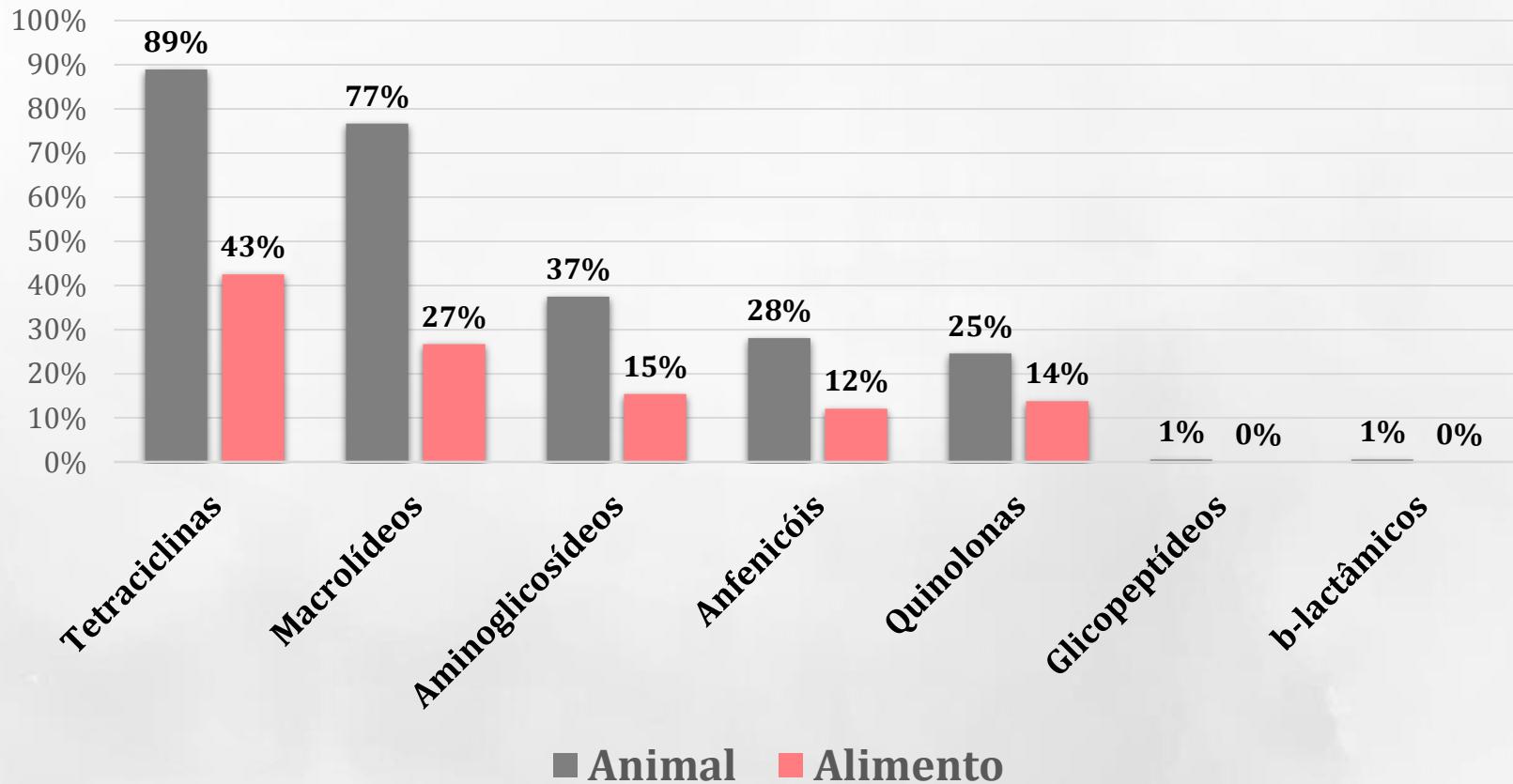
MAJOR ARTICLE

Human Tuberculosis due to *Mycobacterium bovis* in the United States, 1995–2005

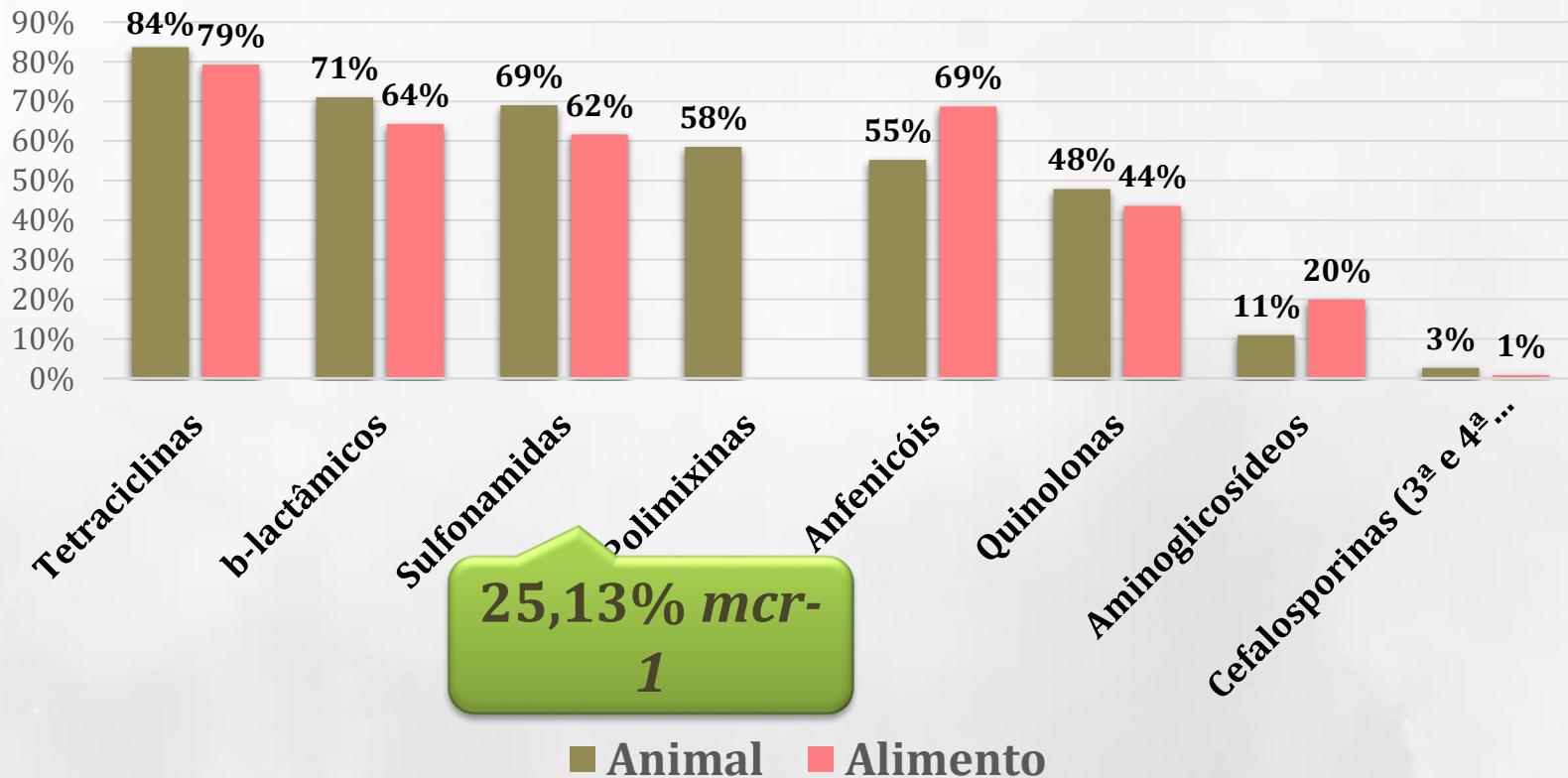
Michele C. Hlavsa,^{1,2} Patrick K. Moonan,² Lauren S. Cowan,² Thomas R. Navin,² J. Steve Kammerer,^{2,3} Glenn P. Morlock,² Jack T. Crawford,² and Philip A. LoBue²

¹Epidemic Intelligence Service, Office of Workforce and Career Development, and ²Division of Tuberculosis Elimination, National Center for HIV/AIDS, Viral Hepatitis, Sexually Transmitted Diseases, and Tuberculosis Prevention, Centers for Disease Control and Prevention, and ³Northrup Grumman, Atlanta, Georgia

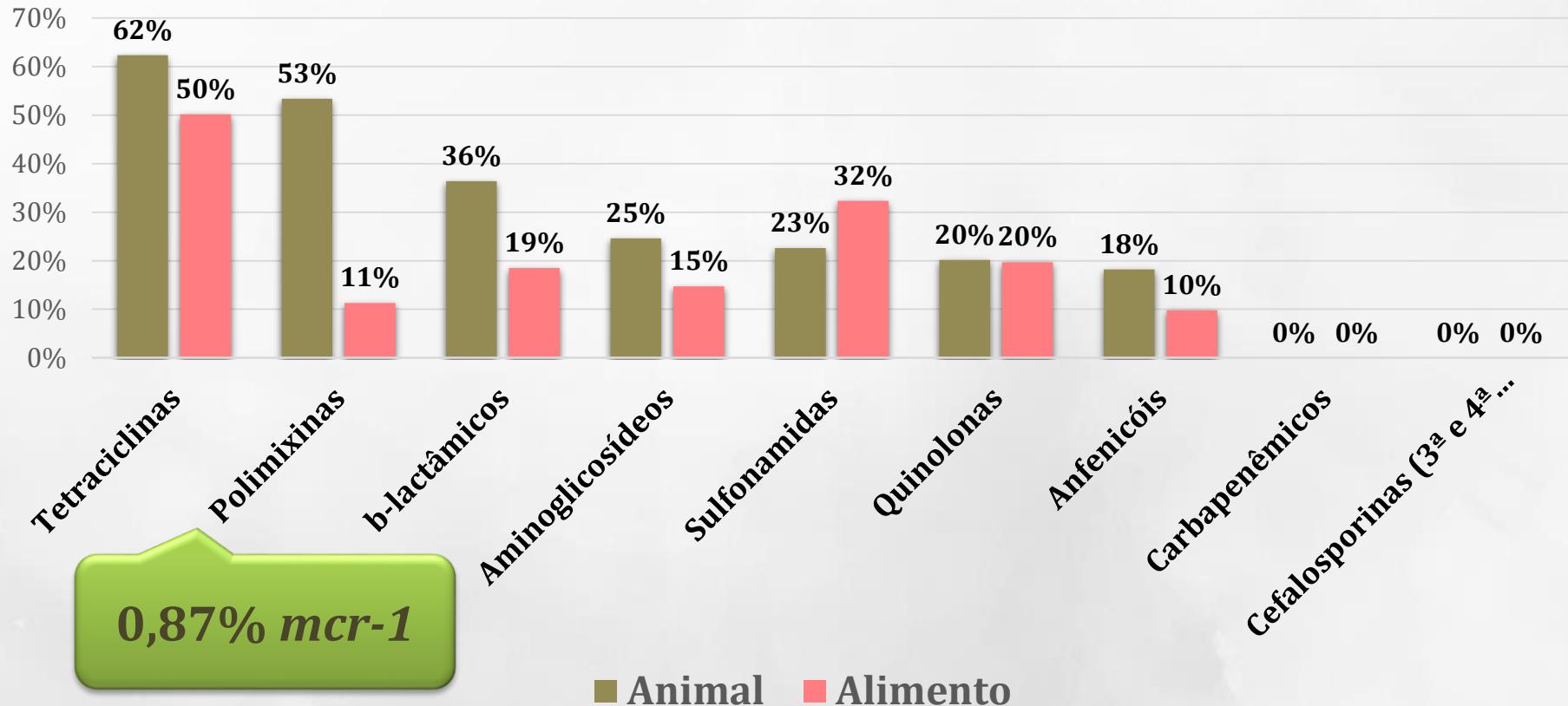
Enterococcus sp. Fezes e carcaças de suínos



Escherichia coli: Fezes e carcaças de suínos

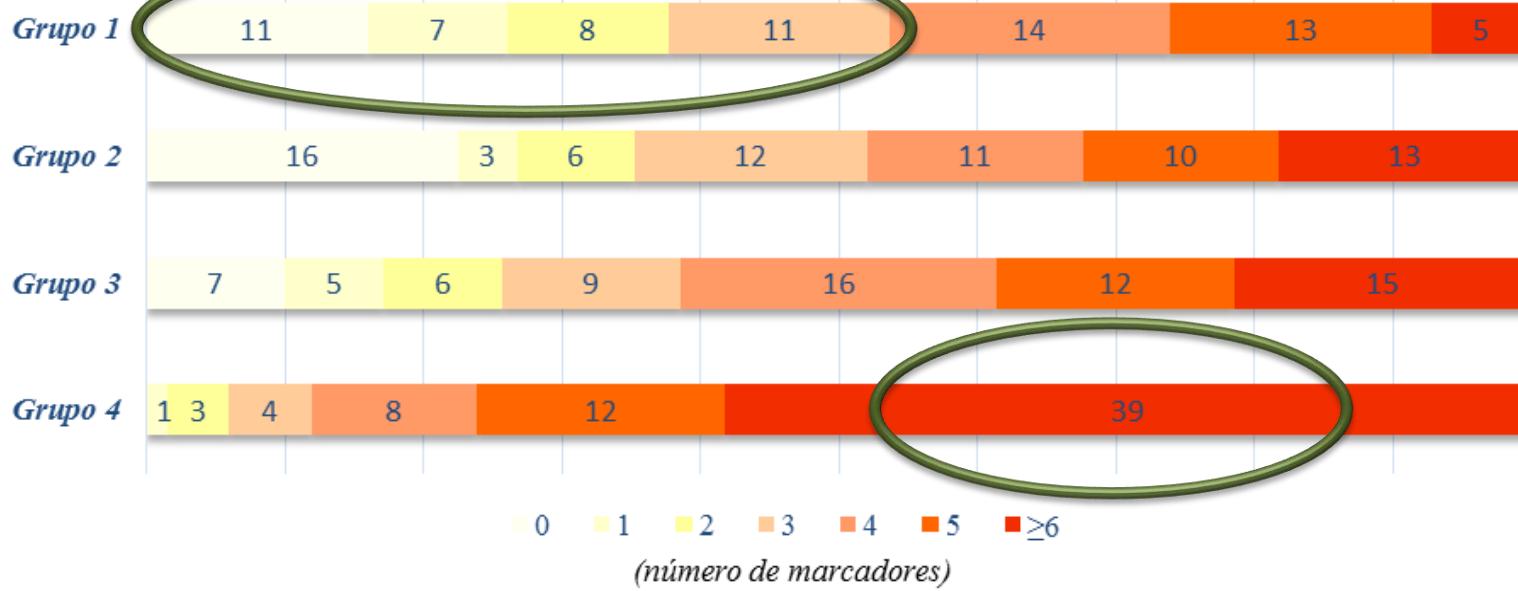


Salmonella enterica: Fezes, linfonodos, carcaças e embutidos



Comparação entre diferentes sistemas de administração de atm

Granjas de suínos X resistência antimicrobiana



Metanalise *Salmonella* de Humanos e Aves

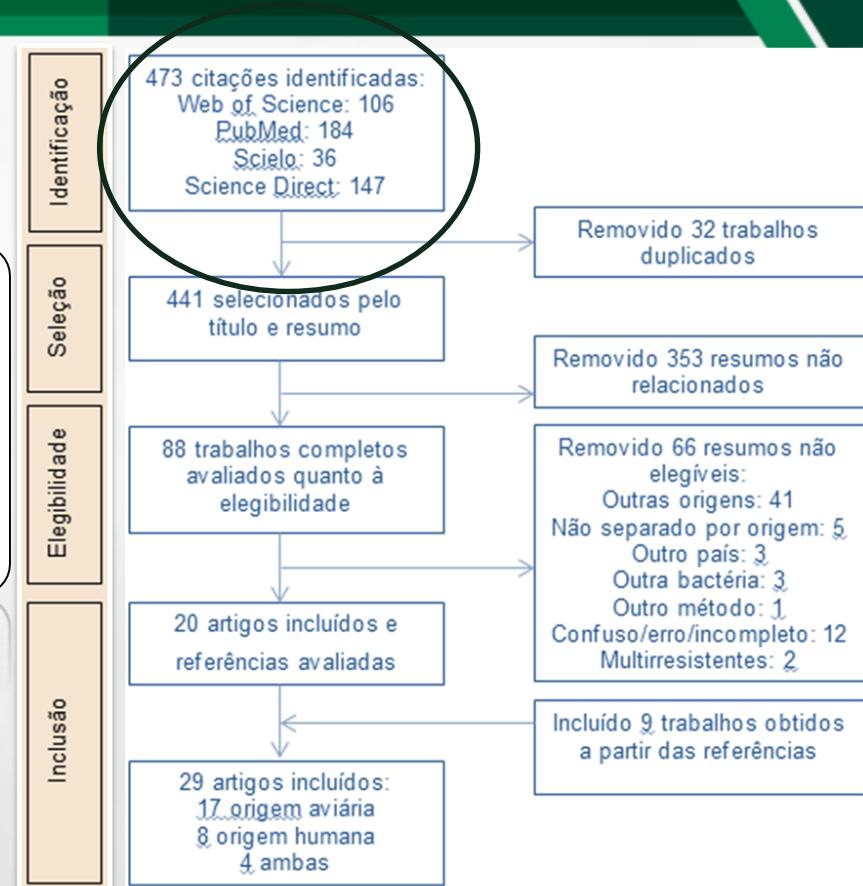
FOODBORNE PATHOGENS AND DISEASE
Volume 14, Number 2, 2017
© Mary Ann Liebert, Inc.
DOI: 10.1089/fpd.2016.2228



Antimicrobial Resistance in Nontyphoidal *Salmonella* Isolated from Human and Poultry-Related Samples in Brazil: 20-Year Meta-Analysis

Daiane Voss-Rech,^{1,2} Luciana Potter,³ Clarissa Silveira Luiz Vaz,² Daniela Isabel Brayer Pereira,⁴ Luis Antonio Sangioni,¹ Águeda Castagna Vargas,¹ and Sônia de Avila Botton^{1,*}

*Correspondence to: Sônia de Avila Botton, Centro de Pesquisas Agropecuária, Instituto Nacional de Pesquisas da Amazonia, Manaus, Amazonas, Brazil. E-mail: sonia.botton@cnptia.embrapa.br

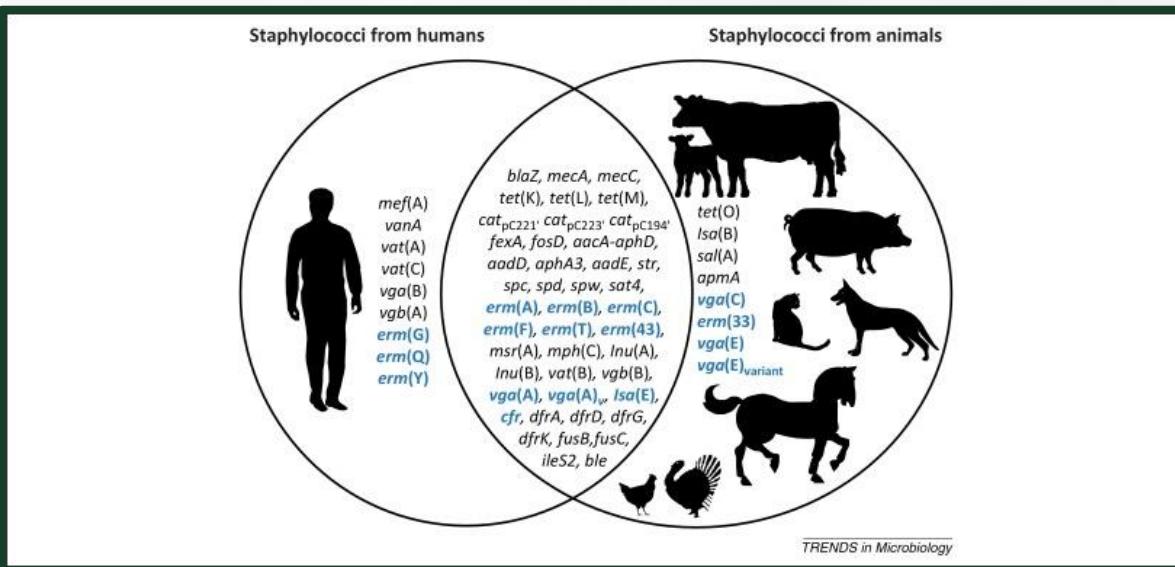
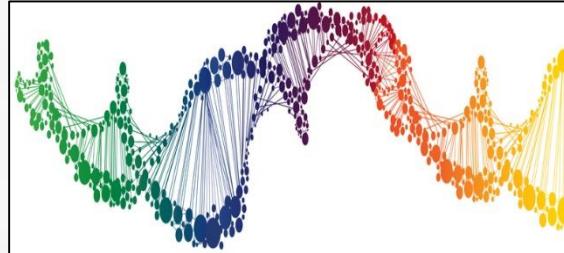
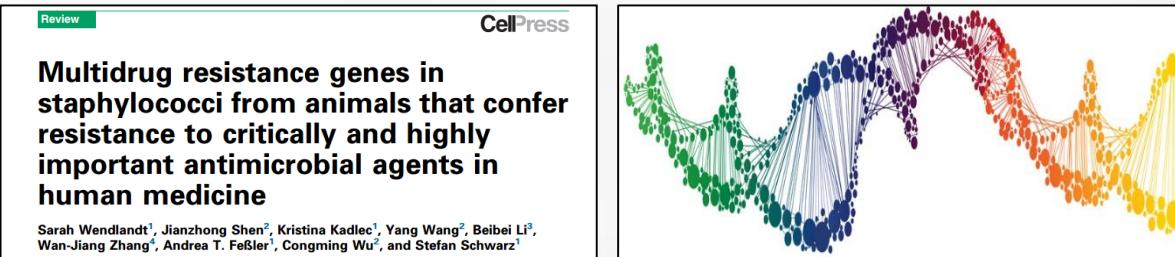


Potenciais rotas de transmissão de bactérias resistentes



Fonte: <http://www.antimicrobial-resistance.biomerieux.com>

A resistência em bactérias de humanos é resultado do uso de antimicrobianos em animais?



Trends in Microbiology 23(1):44-54, 2015

Como organizar a pesquisa para responder a complexidade do problema?

Engajamento na FT global

Interdisciplinaridade

Diagnóstico

Identificação de GAPs específicos

Avançar da pesquisa descritiva

Análise de risco

Ação interministerial: Oficina MS;MAPA, MMA

Captação de recursos

Etc; etc, etc.....



Obrigada pela
atenção!



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Embrapa