



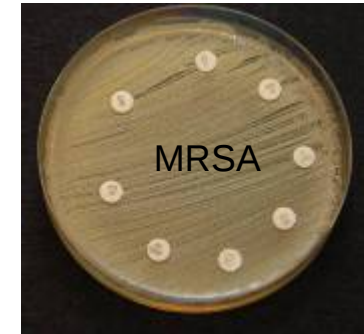
Multiresistente Erreger in Klein- und Großtierarztpraxen

B. Walther, S. Vincze, A. Lübke-Becker

„MRE“ in Tierarztpraxen und Kliniken

1. Therapeutisches Problem

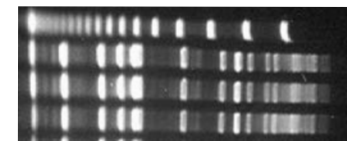
- häufig schlechte Resistenzlage
- tierartliche Unterschiede in Zulassung von Arzneimitteln
- Anwendungsproblematik (Equidenpass, Verträglichkeit etc.)



2. Nosokomiales Problem

- Postoperative Wundinfektionen
- andere opportunistische Infektionen

PFGE- Profil



- Fixierschlinge
- Nase, Tierarzt
- Wundinfektion, Hund

3. Zoonotisches Problem

- behandelnder Tierarzt und Mitarbeiter
- Besitzer des betroffenen Tieres

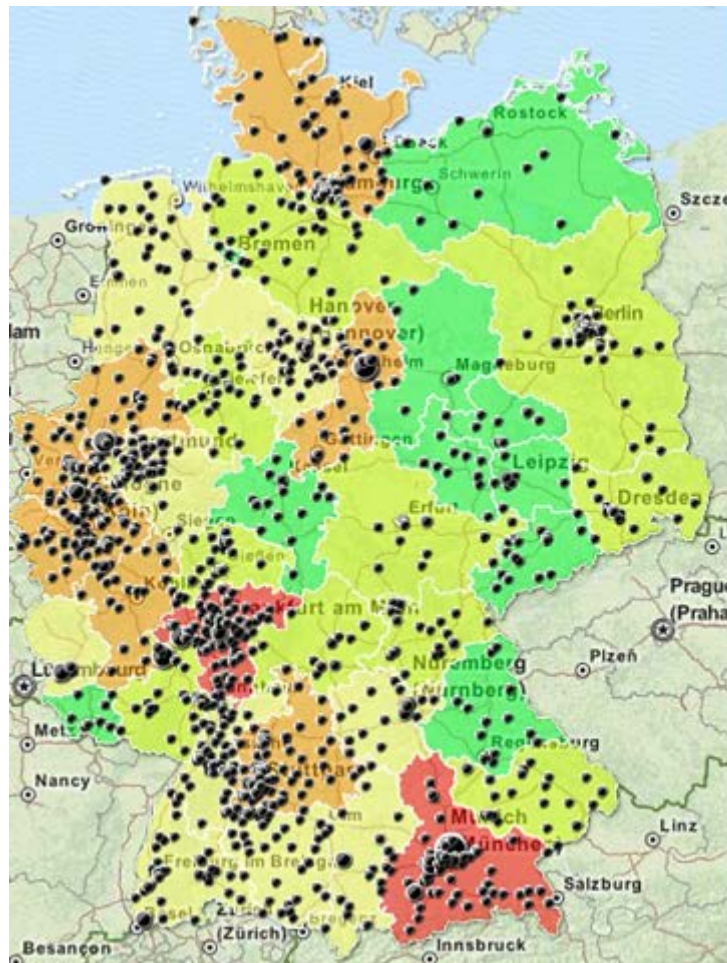


Foto: D. Rabold

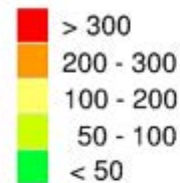
Übersicht: „MRE“

- 
- Methicillin-resistente *Staphylococcus aureus* (MRSA)
 - Methicillin-resistente *Staphylococcus pseudintermedius* (MRSP)
 - Extended-Spektrum-Beta-Laktamase (ESBL)-bildende Erreger wie
E. coli, *P. aeruginosa* oder *K. pneumoniae*
 - *Acinetobacter baumannii*
 - Inhibitor-resistente β -Laktamase-bildende Bakterien
 - Vancomycin-resistente *Enterococcus sp.*

Übersicht: Wundabstriche bundesweit



Number of investigated wound samples according to geographic regions

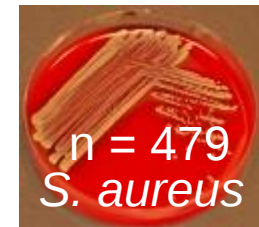


1 170 Einsender

n = 5,229



Vorbericht:
Wundinfektion



PCR Nachweis: *nuc*, *mecA* and *mecC*

(according to Merlino et al. 2002 and Cuny et al. 2012)



Alarming Proportions of Methicillin-Resistant *Staphylococcus aureus* (MRSA) in Wound Samples from Companion Animals, Germany 2010–2012

Silvia Vincze¹, Ivonne Stamm², Peter A. Kopp³, Julia Hermes⁴, Cornelia Adlho⁵, Torsten Semmler¹, Lothar H. Wiele¹, Antina Lübke-Becker¹, Birgit Walther¹

IDEXX Vet-Med-Labor

MRSA: ein signifikantes Problem?

	total	%	dog	%	cat	%	horse	%
wound swabs	5,229	100	3,479	66.5	1,146	21.9	604	11.6
<i>S. aureus</i>	479	100	201	5.8	140	12.2	138	22.8
MSSA	231	48.2	75	2.2	75	6.5	81	13.4
MRSA	248	51.8	126	3.6	65	5.7	57	9.4

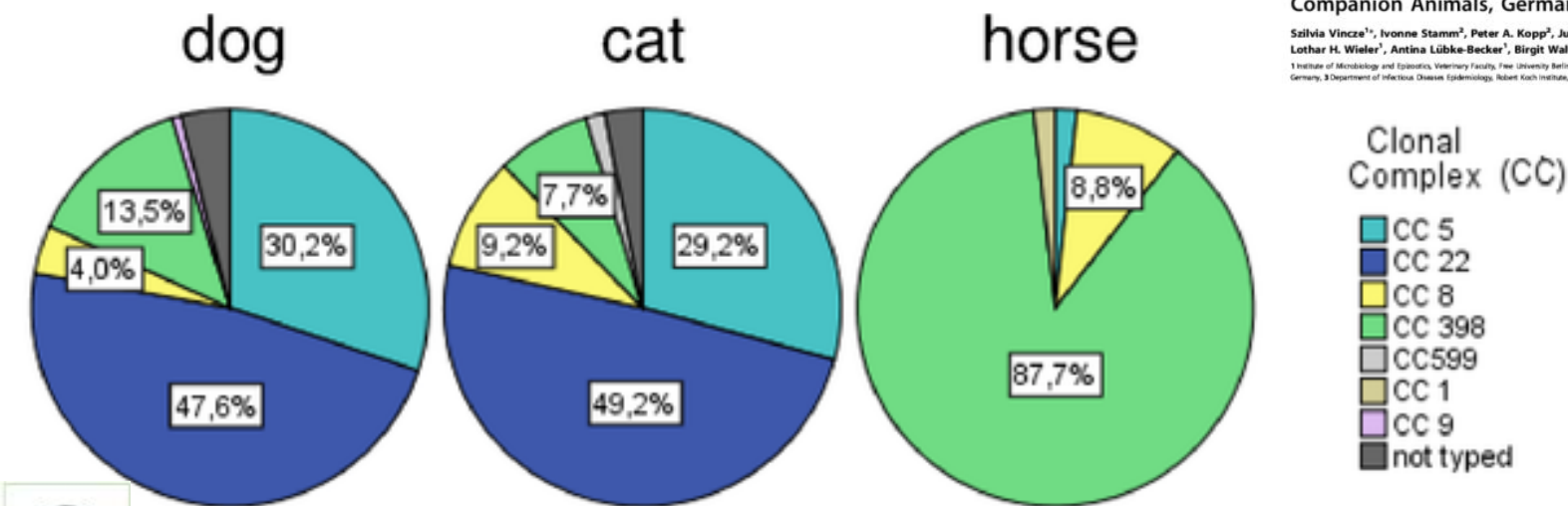
OPEN ACCESS Freely available online

PLOS ONE

Alarming Proportions of Methicillin-Resistant *Staphylococcus aureus* (MRSA) in Wound Samples from Companion Animals, Germany 2010–2012

Szilvia Vincze^{1*}, Ivonne Stamm², Peter A. Kopp², Julia Hermes³, Cornelia Adlhoch², Torsten Semmler¹, Lothar H. Wieler¹, Antina Lübke-Becker¹, Birgit Walther¹

¹ Institute of Microbiology and Epizootics, Veterinary Faculty, Free University Berlin, Germany, ² Vet Med Labor GmbH, Division of DEK Laboratories, Ludwigsburg, Germany, ³ Department of Infectious Diseases Epidemiology, Robert Koch Institute, Berlin, Germany



IDEXX Vet-Med-Labor

mecC-MRSA bei Companion Animals



Characteristics of 10 methicillin-resistant *Staphylococcus aureus* isolates harboring *mecA*_{LGA251} obtained from companion animals, Germany, 2008–2011*

IMT no.	Original no.	Year isolated	Host	Site	Clinical signs	Free-ranging animal	Federal state	OXA MIC [†]	<i>spa</i> type [‡]	ST [§]
17403	VB 999987	2008	Cat	Eye	Purulent infection	Yes	Rhineland-Palatinate	≥4	t10033	1945
21135	VB 964992	2010	Cat	Wound	Lymphadenitis	Yes	Bavaria	≥4	t843	130
21231	VB 971931	2010	Cat	Skin	Dermatitis	Unknown	Hessia	1	t1773	130
24068	VB 961584	2010	Cat	Tachea	Stridor	Yes	Hessia	0.5	t10006	599
25044	VB 969929	2010	Dog	Abscess	Tumor, dolor	No	Bavaria	2	t1694	599
25147	VB 969572-2	2010	Cat	Wound	Suture dehiscence	Yes	North Rhine-Westphalia	2	t278	599
25470	VB 972406	2010	Dog	Eye	Purulent infection	No	Bavaria	2	t1694	599
25715	VB 969935	2010	Guinea pig	Fistula	Purulent infection	No	Hessia	2	t843	130
28299	VB 952042	2011	Cat	Phlegmon	Dermatitis	Yes	Bavaria	1	t278	599
28429	IMT 2272/11	2011	Cat	Abscess	Fever	Yes	Berlin	≥4	t10009	130

*IMT, Institute of Microbiology and Epizootics, Freie Universität Berlin, Berlin, Germany; OXA, oxacillin; ST, sequence type; VB, Vet Med Labor GmbH, Ludwigsburg, Germany. All isolates were positive for *nuc* and negative for *mecA* according to PCR to detect MRSA (8), and all were positive for *mecA*_{LGA251} according to PCR to detect the novel *mecA* homologue (5).

[†]Detected by the VITEK 2 system (bioMérieux, Nürtingen, Germany).

[‡]*Spa* repeats and *spa* type determined according to Harmsen et al. (11) and the Ridom SpaServer (<http://spaserver.ridom.de>).

[§]Determined according to Enright et al. (10).



Risikofaktoren für MRSA-Infektionen

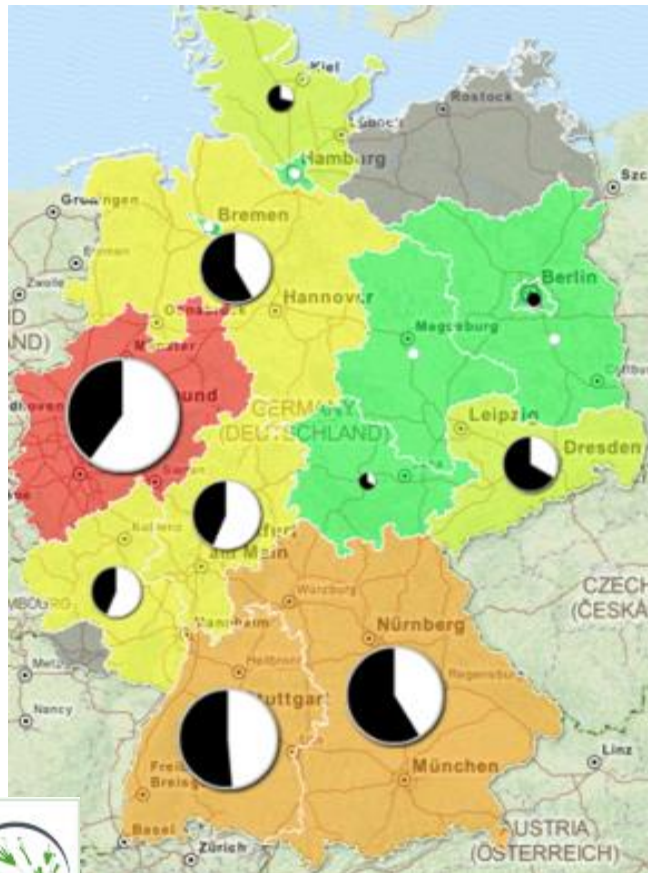
Int J Med Microbiol. 2014 Oct;304(7):787-93. doi: 10.1016/j.ijmm.2014.07.007. Epub 2014 Jul 25.

Risk factors for MRSA infection in companion animals: results from a case-control study within Germany.

Vincze S¹, Brandenburg AG², Espelage W³, Stamm J², Wieler LH⁴, Kopp PA², Lübke-Becker A⁴, Walther B⁴.

⊕ Author information

Abstract



Distribution: MRSA / MSSA

■ MRSA
□ MSSA

Number of participating animal patients

36 - 40
26 - 35
16 - 25
6 - 15
1 - 5

Ergebnisse (Auszug)

- **Anzahl der Beschäftigten**
($n > 10$: $p \leq 0.001$)
- **bereits erfolgte Antibiose**
-systemisch $p = 0.002$
-lokal: $p = 0.049$
-beides: $p = 0.011$
- **postoperative Wundinfektion**
($p \leq 0.001$)

$n = 190$ Praxen und Kliniken



S. pseudintermedius/ MRSP

- häufig missidentifiziert als *S. intermedius* in der Vergangenheit
- assoziiert mit caninen Pyodermie-Komplex (u.a. exfoliative Toxine)
- Kommensale und Opportunist
- *S. pseudintermedius* → **Hund** (auch Katze, Pferd...)
- MRSP: nosokomialer Infektionserreger
- MRSP: oft zahlreiche Resistenzen
- schwere Infektionsfälle durch MSSP und MRSP bei Menschen

Karte nur für veterinärmedizinische Zwecke.

Infos zur Resistenz	Karte:	AST-GP69	Chargenbez:	134329020	Verfallsdatum:	17.12.2015 12:00 CET
	Beendet:	16.02.2015 23:20 CET	Status:	Fertig	Analysen-Dauer:	10,25 Std.
Antibiotikum	MHK	Interpretation	Antibiotikum	MHK	Interpretation	
Cefoxitin-Screen	NEG	*+	Enrofloxacin	>= 4	R	
+Amikacin		R	Erythromycin	>= 8	R	
+Amoxicillin		R	Fusidinsäure	<= 0,5	S	
+Amoxicillin/Clavulansäure		R	Gentamicin	8	*R	
Ampicillin			Gentamicin, High-Level (Synergie)	c		
Ampicillin/Sulbactam	>= 32	R	Imipenem	<= 1	*R	
+Azithromycin		R	Kanamycin	>= 64	R	
+Azlocillin		R	+Lincomycin		R	
Benzylpenicillin	>= 0,5	R	Marbofloxacin	>= 4	R	
+Carbenicillin		R	+Meropenem		R	
+Cefaclor		R	+Minocyclin		R	
+Cefalexin		R	Mupirocin			
+Cefalotin		R	Nitrofurantoin	<= 16	S	
+Cefazolin		R	+Ofloxacin			
+Cefotaxim		R	Oxacillin	>= 4	R	
+Cefovecin		R	+Piperacillin		R	
+Cefpirom		R	+Prulifloxacin		R	
+Ceftazidim		R	Rifampicin	<= 0,5	S	
+Ceftioxon		R	+Teicoplanin		S	
Chloramphenicol	8	S	Tetracyclin	>= 16	R	
+Clarithromycin		R	+Ticarcillin		R	
Clindamycin	>= 8	R	+Tobramycin		R	
Induzierbare Clindamycin Resistenz	NEG	-	Trimethoprim/Sulfamethoxazol	>= 320	R	
+Doxycyclin		R	Vancomycin	<= 0,5	S	

+ = Abgeleitete Antibiotika * = AES modifiziert ** = Anwender modifiziert

Biomerieux Vitek 2, "Veterinär Karte GP"

Methicillin-resistente *S. pseudintermedius* (MRSP)

Erster Fall:

Schwere Aspergillose bei einem Mischlingshund (2005)



Short communication

Prevalence of Methicillin-resistant *Staphylococcus pseudintermedius* isolated from clinical samples of companion animals and equidae

Claudia Ruscher^{a,*}, Antina Lübke-Becker^a, Claus-G. Wleklinski^b, Alexandra Šoba^b, Lothar H. Wieler^a, Birgit Walther^a

^a Institute of Microbiology and Epizootics (IME), Veterinary Faculty, Free University Berlin, Philippstraße 13, 10115 Berlin, Germany
^b Synlab-vet, Labor Augsburg, Leitenhofer Straße 25, 86157 Augsburg, Germany



Widespread rapid emergence of a distinct methicillin- and multidrug-resistant *Staphylococcus pseudintermedius* (MRSP) genetic lineage in Europe

Claudia Ruscher^a, Antina Lübke-Becker^a, Torsten Semmler^a, Claus-G. Wleklinski^b, Angela Paasch^a, Alexandra Šoba^b, Ivonne Stamm^c, Peter Kopp^c, Lothar H. Wieler^a, Birgit Walther^{a,*}

^a Institute of Microbiology and Epizootics (IME), Veterinary Faculty, Free University Berlin, Philippstraße 13, 10115 Berlin, Germany
^b Synlab-vet, Labor Augsburg, Leitenhofer Straße 25, 86157 Augsburg, Germany
^c Vet Med Labor GmbH, Division of IDEXX Laboratories, Mörkestraße 20/3, 71636 Ludwigsburg, Germany

Berl Munch Tierarztl Wochenschr. 2010 Sep-Oct;123(9-10):353-8.

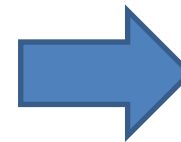
Multidrug- and methicillin resistant *Staphylococcus pseudintermedius* as a cause of canine pyoderma: a case report.

Vincze S, Paasch A, Walther B, Ruscher C, Lübke-Becker A, Wieler LH, Barbara K.

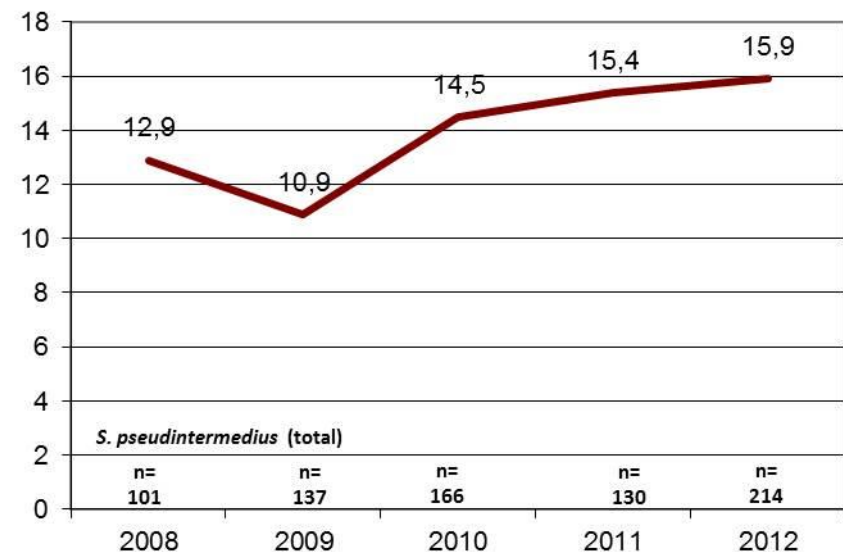
Institute of Microbiology and Epizootics (IME), Veterinary Faculty, Free Universität Berlin, Berlin, Germany.

Abstract

A case of a dog with a long-term inflammatory skin disorder due to infection with methicillin-resistant *Staphylococcus pseudintermedius* (MRSP).



% Proben: Hunde, Katzen Pferde



ESBL-produzierende Enterobacteriaceae

Table 3
Summary of studies describing the isolation of ESBL producing Enterobacteriaceae from clinical diagnostic samples.

Population of Animals	Bacterial species	ESBL/CMY type and frequency	Country	Reference
Horses 2003–2005 (n = 1347)	<i>E. coli</i> (n = 4), <i>K. pneumoniae</i> (n = 3) phenotypically	CTX-M-1 (n = 5, 0.37%)	Netherlands	Vo et al., 2007
^a Dogs and cats (n = 228) 2004–2006	<i>E. coli</i> (n = 2) both canine	CTX-M-1, CTX-M-15	Germany	Schink et al., 2011
Dog and cat diagnostic samples (n = 298, 226 canine, 72 feline)	<i>E. coli</i>	CTX-M-1 (n = 16), SHV-12 (n = 4), CMY-2 (n = 3)	Italy	Carattoli et al., 2005
Dog and cat UTI (n = 150)	<i>E. coli</i>	CMY (n = 53 canine n = 43, feline n = 10), CTX-M-15 (canine n = 5, feline n = 4), CTX-M-14 (canine n = 1)	United States	O'Keefe et al., 2010
^a Dogs and cats (n = 99 animals, 107 isolates; 59 dogs, 40 cats) March 2010–December 2011	<i>E. coli</i> 107 total, eight isolates from 4 animals had ESBL phenotype.	CTX-M-15 (canine n = 2, 3.4%; feline n = 2, 5%). Canine ST533 and ST410, feline ST410 and 648.	Switzerland	Huber et al., 2013
^a Horses, dogs and cats (n = 65 phenotypic ESBL from ~2700 diagnostic isolates)	<i>E. coli</i> , <i>S. enterica</i> , <i>P. mirabilis</i> , <i>C. freundii</i> , <i>E. cloacae</i>	CTX-M-1 (<i>E. coli</i>), CTX-M-14 (<i>E. coli</i>), CTX-M-15 (<i>E. coli</i>), CTX-M-9 (<i>E. cloacae</i>), TEM-52 (<i>E. coli</i> , <i>S. enterica</i>), CMY-2 (<i>E. coli</i> , <i>P. mirabilis</i>), CMY-39 (<i>C. freundii</i>)	Netherlands	Dierikx et al., 2012

^a Strain data (*E. coli* MLST) available in publication.

J Antimicrob Chemother 2010; 65: 651–660
doi:10.1093/jac/dkq004 Advance publication 29 January 2010

Journal of
Antimicrobial
Chemotherapy

Emergence of human pandemic O25:H4-ST131 CTX-M-15 extended-spectrum-β-lactamase-producing *Escherichia coli* among companion animals

Christa Ewers¹*, Mirjam Grobbel², Ivonne Stamm³, Peter A. Kopp¹, Ines Diehl¹, Torsten Semmler¹, Angelika Fruth⁴, Janine Beutlich⁵, Beatriz Guerra⁶, Lothar H. Wieler¹ and Sebastian Guenther¹

¹Institute of Microbiology and Epizootics, Freie Universität Berlin, Philippstr. 13, 10115 Berlin, Germany; ²Leibniz Institute for Zoo and Wildlife Research, Alfred-Kowalk-Str. 17, 10315 Berlin, Germany; ³Vet Med Labor GmbH, Moerenstr. 28/3, 71636 Ludwigsburg, Germany; ⁴National Reference Centre for Salmonella and Other Enteric Pathogens, Robert Koch Institute, Burgstr. 37, 38855 Wernigerode, Germany; ⁵Department of Biological Safety, Federal Institute for Risk Assessment (BfR), Diedersdorfer Weg 1, 12277 Berlin, Germany

American Journal of Infection Control 41 (2013) 831–5



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American Journal of Infection Control

journal homepage: www.ajicjournal.org



Major article

Extended-spectrum β-lactamase-producing *Enterobacteriaceae* in healthy companion animals living in nursing homes and in the community

Paola Gandolfi-Decristophoris PhD^{a,b,c}, Orlando Petrini PhD^a, Nadia Ruggeri-Bernardi^a, Esther Schelling PhD, DVM^{b,c,*}

^aCantonal Institute of Microbiology, Bellinzona, Switzerland

^bHuman and Animal Health Unit, Swiss Tropical and Public Health Institute, Basel, Switzerland

^cUniversity of Basel, Basel, Switzerland

ESBL-Connections ?!



ORIGINAL RESEARCH ARTICLE
Putative connection between zoonotic multiresistant extended-spectrum beta-lactamase (ESBL)-producing *Escherichia coli* in dog feces from a veterinary campus and clinical isolates from dogs

Katharina Schaeffer, PhD Student¹, Astrid Buthe, PhD², Antina Lübbe-Böcker, PhD², Christa Ewers, PhD², Barbara Köhn, PhD², Lothar H. Wieler, PhD² and Sebastian Quentner, PhD²

¹Center for Infection Medicine, Institute of Microbiology and Epidemiology, Freie Universität Berlin, Berlin, Germany; ²Institute of Hygiene and Infectious Diseases of Animals, Justus Liebig University Gießen, Germany; ³Clinic of Small Animals, Faculty of Veterinary Medicine, Freie Universität Berlin, Berlin, Germany

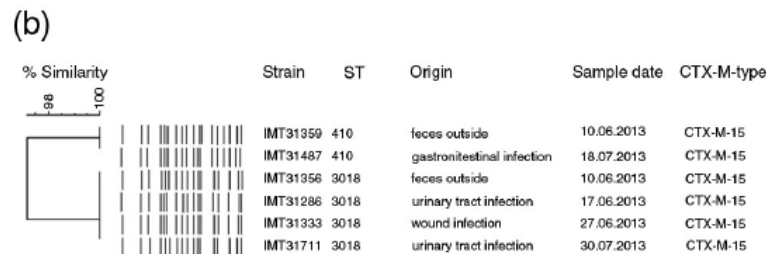
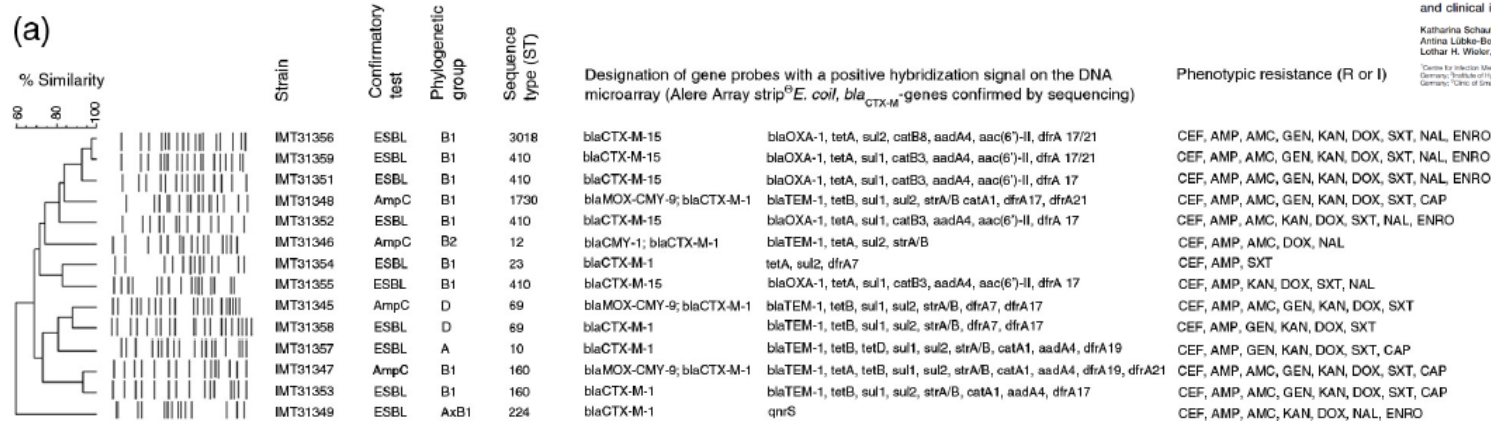
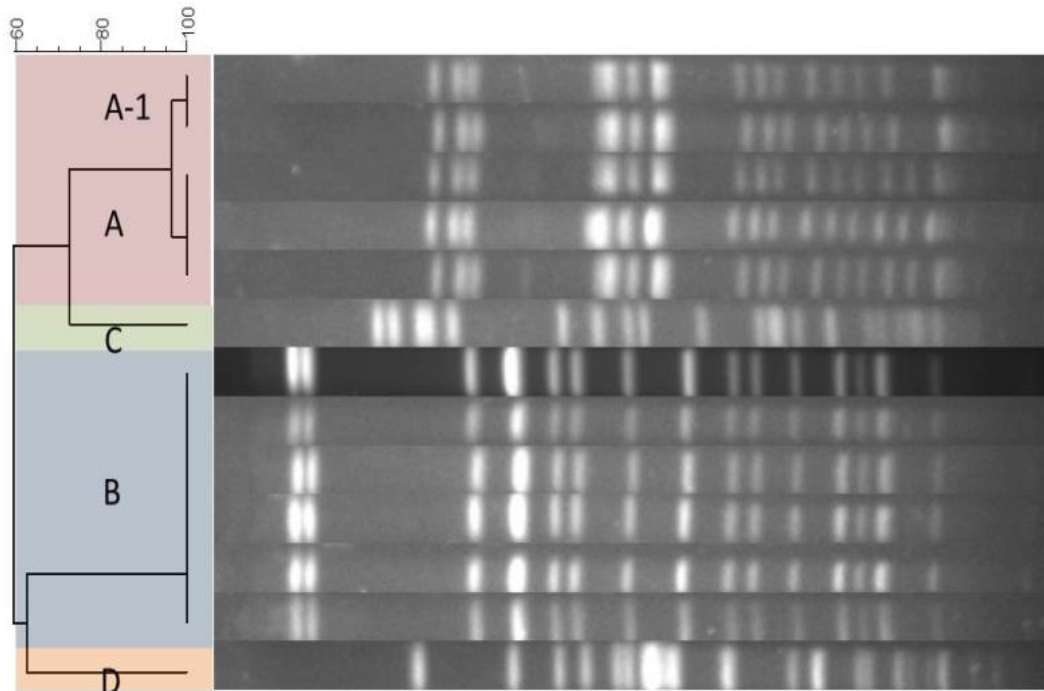


Fig. 1. (a) Phenotypic and genotypic typing results of ESBL- and AmpC-producing *E. coli* isolates based on a dendrogram (> *Xba*I-generated PFGE profiles after exclusion of double clones). Software: BioNumerics 6.6, Applied Maths, Belgium, cluster analysis of dice similarity indices based on the unweighted pair group method with arithmetic mean (UPGMA). (b) Comparison of clones from clinical dog isolates and extra-clinical fecal samples.

CEF: cefotaxime; AMP: ampicillin; AMC: amoxicillin-clavulanic acid; GEN: gentamicin; KAN: kanamycin; DOX: doxycycline; SXT: sulfamethoxazole-trimethoprim; CAP: chloramphenicol; NAL: nalidixic acid; ENRO: enrofloxacin; R: resistant; I: intermediate.

NI: Pferdekliniken



Day of isolation	Strain designation	Origin	Site (sample)	ESBL enzyme	ST
5	IMT26115	horse B	SSI	CTX-M1	10
1	IMT26405	horse A	joint infection	CTX-M1	10
1	IMT26112	horse A	SSI	CTX-M1	10
5	IMT26176	horse C	SSI	CTX-M1	10
5	IMT26383	horse A	tracheal wash	CTX-M1	10
7	IMT26118	horse B	peritoneal fluid	CTX-M1	1011
7	IMT26404	horse A	joint infection	none	354
12	IMT26111	horse A	SSI	none	354
12	IMT26116	horse B	SSI	none	354
14	IMT26172	horse C	SSI	none	354
14	IMT26190	fixation rope	surface	none	354
22	IMT26382	horse A	tracheal wash	none	354
22	IMT26576	drop down box	floor	SHV-12	224

Berliner und Münchener Tierärztliche Wochenschrift 127, Heft 11/12 (2014), Seiten 421–427 421

Bref. Münch. Tierärztl. Wochenschr. 127, 421–427 (2014)
DOI: 10.2376/0005-9366-127-421

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ISSN 0005-9366

Korrespondenzadresse:
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Eingegangen: 10.04.2014
Angenommen: 10.06.2014

Case report/Fallbericht

Centre for Infection Medicine, Institute of Microbiology and Epidemiology, Veterinary Faculty, Freie Universität Berlin, Germany¹
Vet Med Labor GmbH, Division of IDEXX Laboratories, Ludwigslburg, Germany²
Equine Clinic for Surgery and Radiology, Veterinary Faculty, Freie Universität Berlin, Germany³

Suspected nosocomial infections with multi-drug resistant *E. coli*, including extended-spectrum beta-lactamase (ESBL)-producing strains, in an equine clinic

Fallbericht über vermutlich nosokomiale Infektionen durch multi-resistente E. coli in einer Pferdeklinik einschließlich Extended-Spectrum Beta-Lactamase (ESBL)-produzierender Isolate

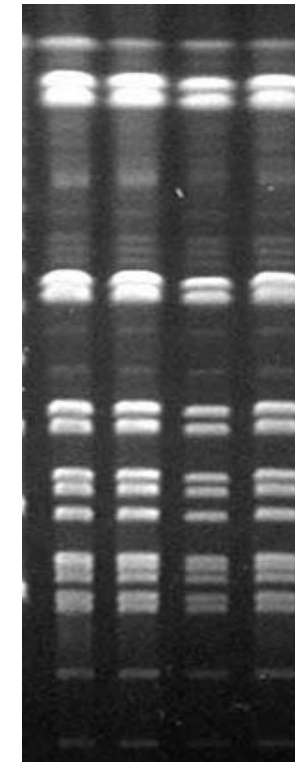


NI: Beispiel Kleintierkliniken

Berl Munch Tierarztl Wochenschr. 2009 May-Jun;122(5-6):178-85.

Staphylococcus aureus and MRSA colonization rates among personnel and dogs in a small animal hospital: association with nosocomial infections.

Walther B¹, Wieler LH, Friedrich AW, Kohn B, Brunnberg L, Lübke-Becker A.



A B C D

MRSA (PFGE)

A: Nase, Chirurg

B: Wunde, Hund

C: Wunde, Kan.

D: Wunde, Vogel

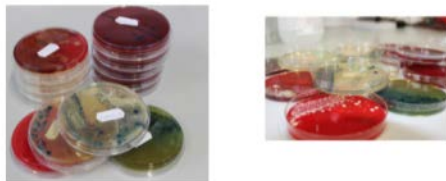
Ausblick

First study results: horse screening at admission (nose)

Start: May 2014
(data until 02.09.2014)

PRELIMINARY, UNCORRECTED DATA

Admission (nose)	ID: colic (n=91)	%	ID: wound (n= 44)	%	total (n= 135)	%
MRSA	2	2,2%	1	2,3%	3	2,2%
ESBL-prod. Enterobacteriaceae	3	3,3%	1	2,3%	4	3%
<i>Acinetobacter baum.</i> complex	6	6,6%	2	4,5%	8	5,9%



Dissertation: K. S. Klein

Probleme identifizieren

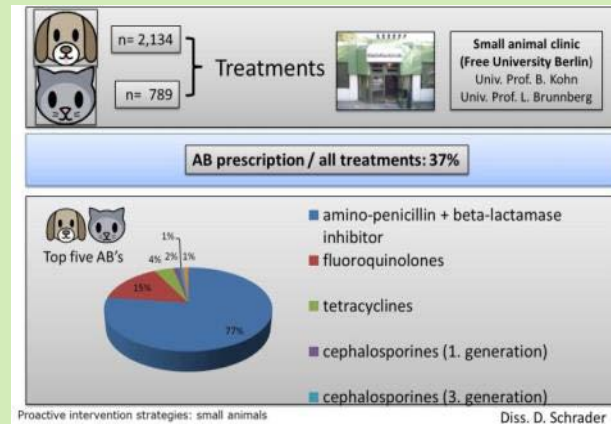
Empfehlungen zur Auswahl eines geeigneten Antibiotikums I

Beispiel : Harnwegsinfektionen bei Hund und Katze

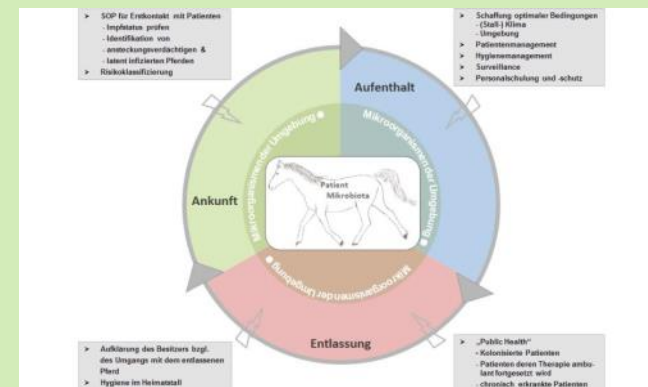
Infektionstyp	Empfehlung für Chemotherapeutika der ersten Wahl
Unkomplizierte HWI	Amoxicillin, Trimethoprim-Sulfonamide
Komplizierte HWI	Behandlung nach Ergerdidentifikation und Antibiotogramm, aber initial Amoxicillin oder Trimethoprim-Sulfonamide erwägen
Subklinische Bakteriurie	Antimikrobielle Therapie nicht empfehlen wenn nicht hohe Gefahr für Aufstieg der Infektion besteht. Wenn aufsteigende Infektion befürchtet wird, wie komplizierte HWI behandeln
Pyelonephritis	Therapiestart mit Fluorchinolonen Überprüfen der Therapie mit Kultur und Antibiotogramm

<http://www.hindawi.com/journals/2014/2014/263768>

Empfehlungen & Antibiotic Stewardship



Antibiotika Einsatz ?



Hygiene, Infektionskontrolle & Arbeitsschutz



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Bundesministerium
für Bildung
und Forschung



MedVet-Staph



Kleintierklinik Freie Universität Berlin

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