MRE (multiresistente Erreger)

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MRE

- MRSA, VRE
- ESBL+ (sonstige multiresistente gramnegative Bakterien)
- MDR-/XDR-Tuberkulose

MRE

- MRSA, VRE
- ESBL+ (sonstige multiresistente gramnegative Bakterien)
- MDR-/XDR-Tuberkulose

MRSA

MRSA

- M=Methicillin (=Oxacillin):
  - bedeutet Resistenz gegenüber ß-Lactame
- viele MRSA-Stämme sind (hier) gut empfindlich auf ältere Antibiotika, z.B.
  - Doxycyclin
  - Cotrimoxazol
- es gibt einige neue MRSA-wirksame Antibiotika (incl. ß-Lactame !!!)
- (Screening +) Dekolonisierung möglich

MRSA-Dekolonisierung

- Evaluation der holländischen Strategie seit 2006
- Mupirocin + Chlorhexidin (+ systemische Antibiotika bei “komplizierten” Fällen)
- N=613
- Erfolg 60% nach einmaligem Zyklus, 80% insgesamt
- Behandlung nach Protokoll (natürlich) erfolgreicher

Ammerlaan et al *JAC* 2011

Antibiotika Resistenz Surveillance

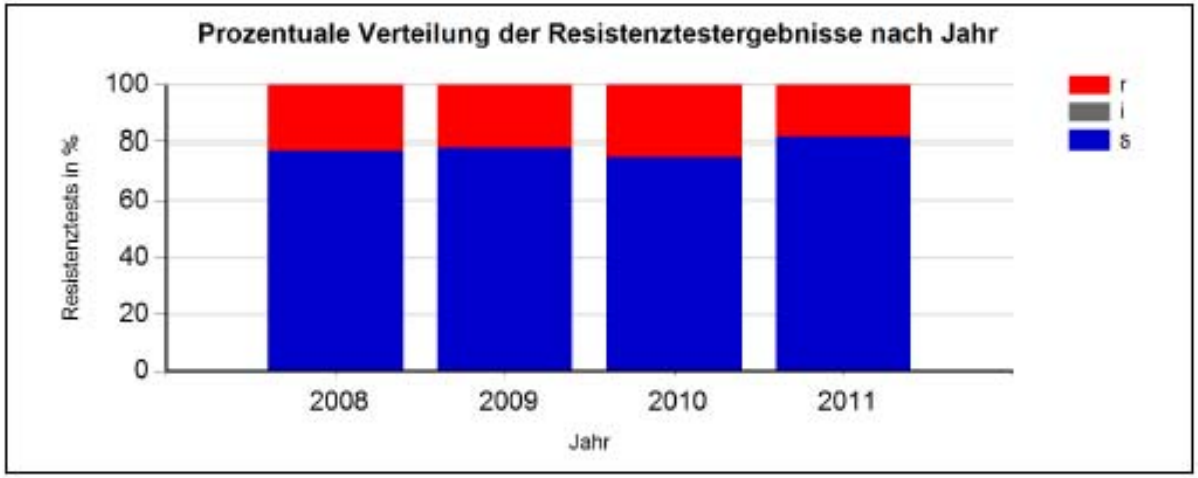
ROBERT KOCH INSTITUT

Parameter:

Erreger:	Staphylococcus aureus	Materialgruppe:	Blutkultur
Antibiotikum:	Oxacillin	Fachrichtung:	Alle
Versorgungsbereich:	stationäre Versorgung	Stationstyp:	Alle
Intervall:	Jahr	Versorgungsstufe:	Alle

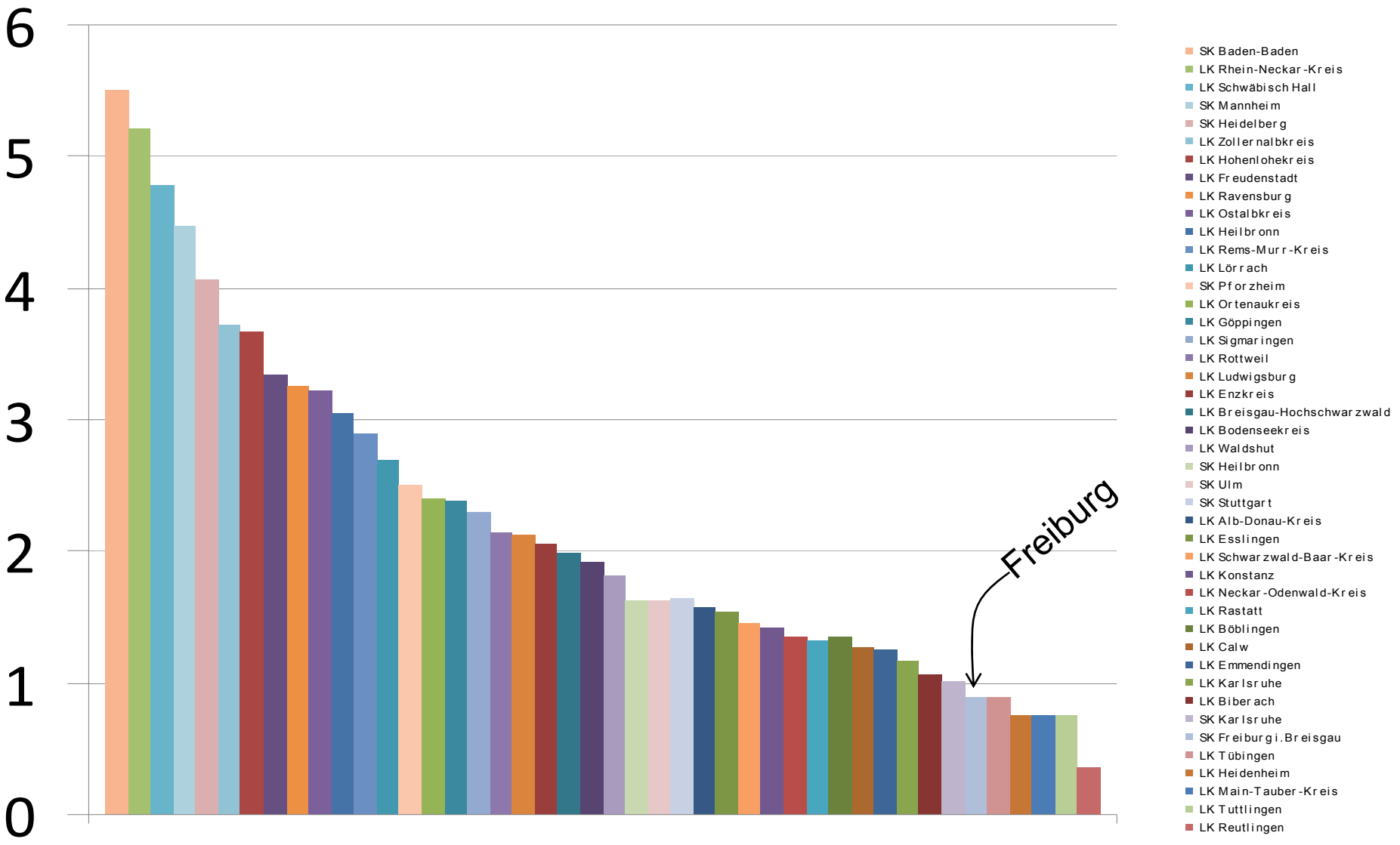
Datenstand: 26.06.2012

Intervall	R		I		S		Total
	n	%	n	%	n	%	n
Jahr 2011	296	18,3	0	0.0	1324	81,7	1620
Jahr 2010	363	24,7	0	0.0	1104	75,3	1467
Jahr 2009	271	21,4	0	0.0	998	78,6	1269
Jahr 2008	177	22,3	0	0.0	615	77,7	792



MRSA-“Sepsis“-Inzidenz 2011

(pro 100.000 Einwohner und Jahr; Quelle: SurvStat@RKI 7.3.2012)



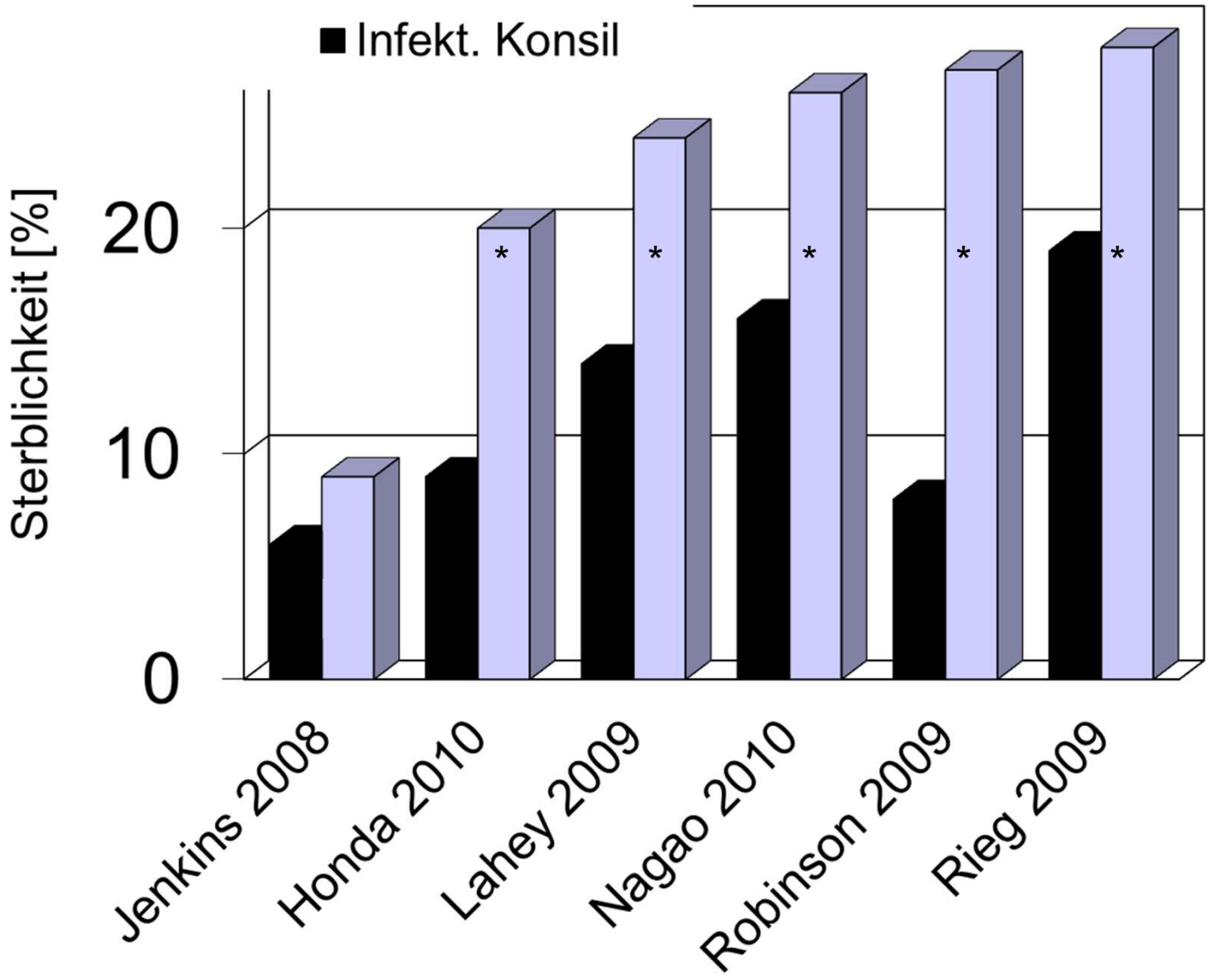
MRSA-Infektion

MRSA-Infektion

- Haut-Weichteil- und Wundinfektionen
- Knochen- und Gelenkinfektion
- Pneumonie
- Bakteriämie/Sepsis
  - Unkompliziert
  - Kompliziert
  - Verschiedne Foci/Lokalisationen


Meropenem
+Vanco
Pip-Tazo
+ Cipro
Imipenem
Cortison
abwarten
Ceftazidim
+Clindamycin
+ Colistin

S. aureus-Bakteriämie (SAB)



Therapie der MRSA-Infektion

- „traditionell“: Vancomycin

MRSA

- viele MRSA-Stämme sind (hier) gut empfindlich auf ältere Antibiotika, z.B.
  - Doxycyclin
  - Cotrimoxazol
- es gibt einige neue MRSA-wirksame Antibiotika (incl. ß-Lactame !!!)

MRSA: Therapieoptionen (in Deutschland)

Tab. 4.1.2.2: Resistenz gegen Antibiotika (zusätzlich zur Resistenz gegen β-Lactamantibiotika) bei ha-MRSA, 2006–2010

Antibiotikum	2006 (%)	2007 (%)	2008 (%)	2009 (%)	2010 (%)
Oxacillin	100	100	100	100	100
Ciprofloxacin	93,8	95,8	91	90	86
Moxifloxacin	96,3	94,4	89,6	87	86
Erythromycin	72,5	75	80,7	67	65
Clindamycin	65,4	72	73,4	60	59
Gentamicin	13,3	9,8	10,5	9,5	5,3
Oxytetracyclin	7,4	6,8	7,3	8	6,0
Rifampicin	2,5	1,07	0,4	1,6	0,8
Cotrimoxazol	3,1	2	10,8	5,3	0,8
Fusidinsäure	6,4	3,8	2,0	5,2	4,0
Fosfomycin	3,3	0,56	1,1	0,15	0,6
Linezolid	0,04	0,11	0,1	0,1	0,08
Tigecyclin	0	0	0	0	0,12
Daptomycin	0	0	0,65	1,3	1,6
Mupirocin	2,6	3,3	5,3	4,0	4,6
Vancomycin	0	0	0	0	0,08
Teicoplanin	0	0	0	0	0,2

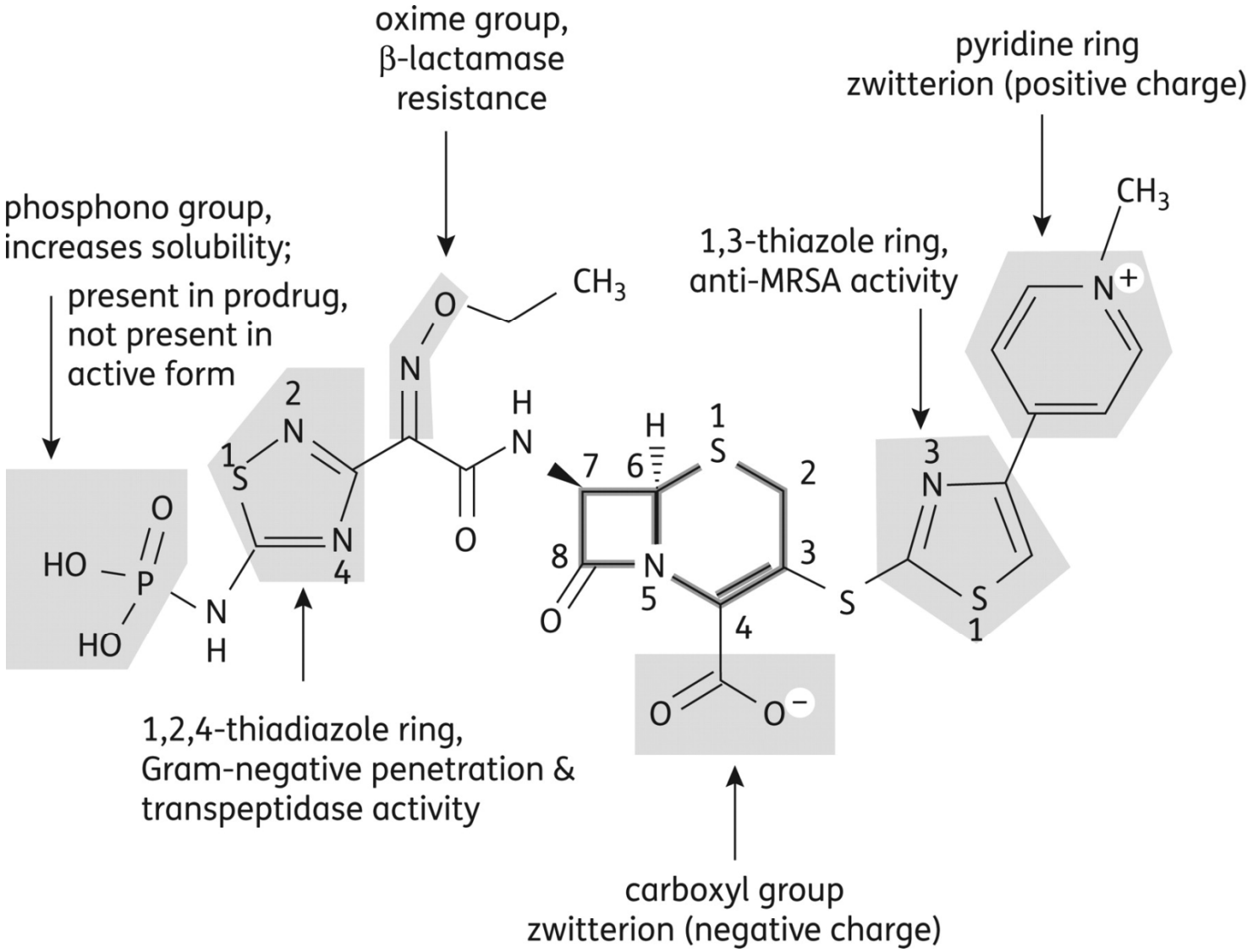
GERMAP 2010

MRSA: Therapieoptionen ?

- MRSAB/schwere Infektion
  - Vancomycin-Dosiseskalation ☹
  - Kombination, z.B. Rifampicin ☺?
  - alternative Substanzen ☺
    - Daptomycin (ok, nicht sicher besser) (nicht: Pneumonie)
    - Linezolid (bei Pneumonie besser und ok, aber …. bakteriostatisch)
    - sonst: wenig Daten
- SSTI und andere lokalisierte Infektionen (cave: Fremdkörper)
  - ?
  - Doxycyclin, Citrimoxazol, Linezolid, Clindamycin
  - Fusidinsäure, Pristinamycin, …

… neue MRSA-ß-Lactame ??

Ceftarolin-Fosamil (Prodrug)



Ceftarolin

- MHK_{90} (µg/mL) Staphylokokken
  - MSSA 0.25
  - MRSA 1.0

- MHK_{90} (µg/mL) Pneumokokken
  - PenS 0.015
  - PenR 0.125

Ceftarolin (u.a.)

- (gut) studiert bei (und zugelassen für)
  - ambulant erworbene Pneumonie
  - Haut-Weichteilinfektionen
- Kaum Erfahrung bei schweren MRSA-Infektionen, hier möglicherweise unterdosiert (?)

Analyse von Fleischproben auf MRSA und ESBL-produzierende Keime – Fragen und Antworten

Autorin: Dr. Kathrin Birkel

Stand: 24. Januar 2012

Quellen für alle Angaben liegen beim BUND vor.

BUND-Stichprobenuntersuchung von Hähnchenfleisch auf MRSA und ESBL-produzierende Keime – Befunde Dezember 2011			
Ort/ Einkaufsstätte	*Marke*	*Produktionsfirma*	*Befund*
Berlin			
Edeka	Heidegold	Wiesenhof	ESBL: positiv - E.coli; MRSA: negativ
Edeka	Heidegold	Wiesenhof	ESBL: negativ; MRSA: negativ
Penny	Juwel	Stolle	ESBL: positiv - E.coli; MRSA: negativ
Penny	Juwel	Stolle	ESBL: positiv - E.coli; MRSA: negativ
Hamburg			
Netto	Gut Ponholz	Stolle	ESBL: positiv - E.coli; MRSA: negativ
Netto	Gut Ponholz	Stolle	ESBL: positiv
Rewe	Wilhelm Brandenburg	Sprehe	
Rewe	Wilhelm Brand		
Köln			
Netto			
			positiv - E.coli; MRSA: negativ
		Sprehe	ESBL: positiv - E.coli; MRSA: negativ
		Sprehe	ESBL: positiv - E.coli; MRSA: negativ
Aldi	geka	Wiesenhof	ESBL: negativ; MRSA: negativ
Aldi	geka	Wiesenhof	ESBL: negativ; MRSA: negativ
Edeka	Astenhof	Sprehe	ESBL: positiv - E.coli; MRSA negativ
Edeka	Astenhof	Sprehe	ESBL: negativ; MRSA: negativ
Stuttgarter Region			
Aldi	Landgeflügel	Rothkötter	ESBL: negativ; MRSA: negativ
Metro	Astenhof	Sprehe	ESBL: negativ; MRSA: negativ
Lidl	Landjunker	Wiesenhof	ESBL: positiv - E.coli; MRSA: negativ
Kaufland	Wiesenhof	Wiesenhof	ESBL: negativ; MRSA: negativ

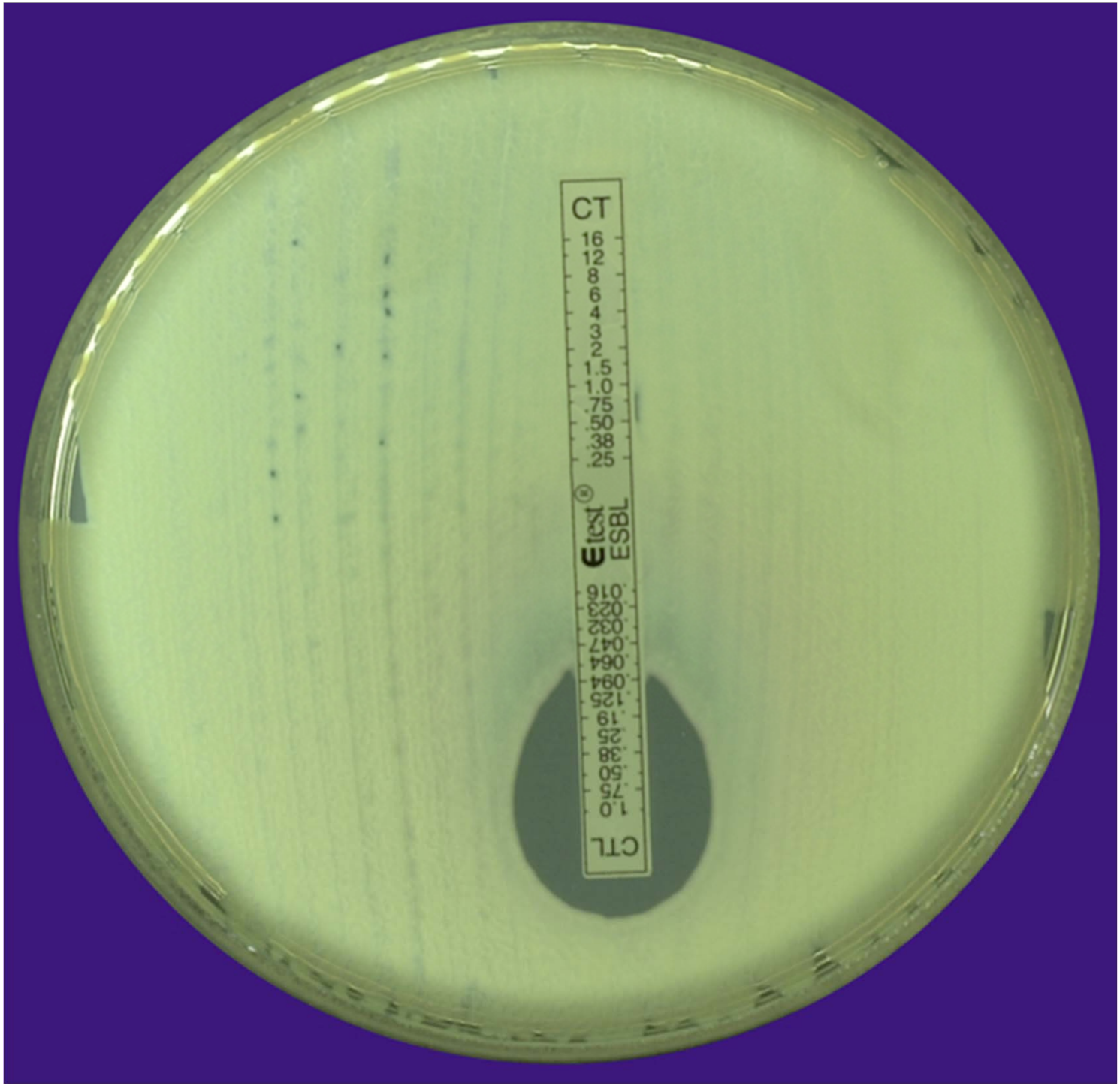
… a total of 399 chicken meat samples from nine super-market chains, four organic food stores and one butcher's shop in two geographically distinct regions (Berlin and Greifswald) were screened for ESBL production ...

…. ESBL isolates were obtained from 175 samples (43.9%) from all tested sources.

No differences could be observed in the prevalence of ESBL producers between organic and conventional samples.

73% of the ESBL producers showed co-resistance to tetracycline, 36% to co-trimoxazole and 8% to ciprofloxacin

Kola et al *JAC* 2012


CT
16
12
8
6
4
3
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1.5
1.0
.75
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.38
.25
E test ESBL
.016
.023
.032
.047
.064
.094
.125
.19
.25
.38
.50
.75
1.0
CTL

From MICs to S / I / R : where are the limits ?

Which breakpoint do you use ?

before …

now … (2009)

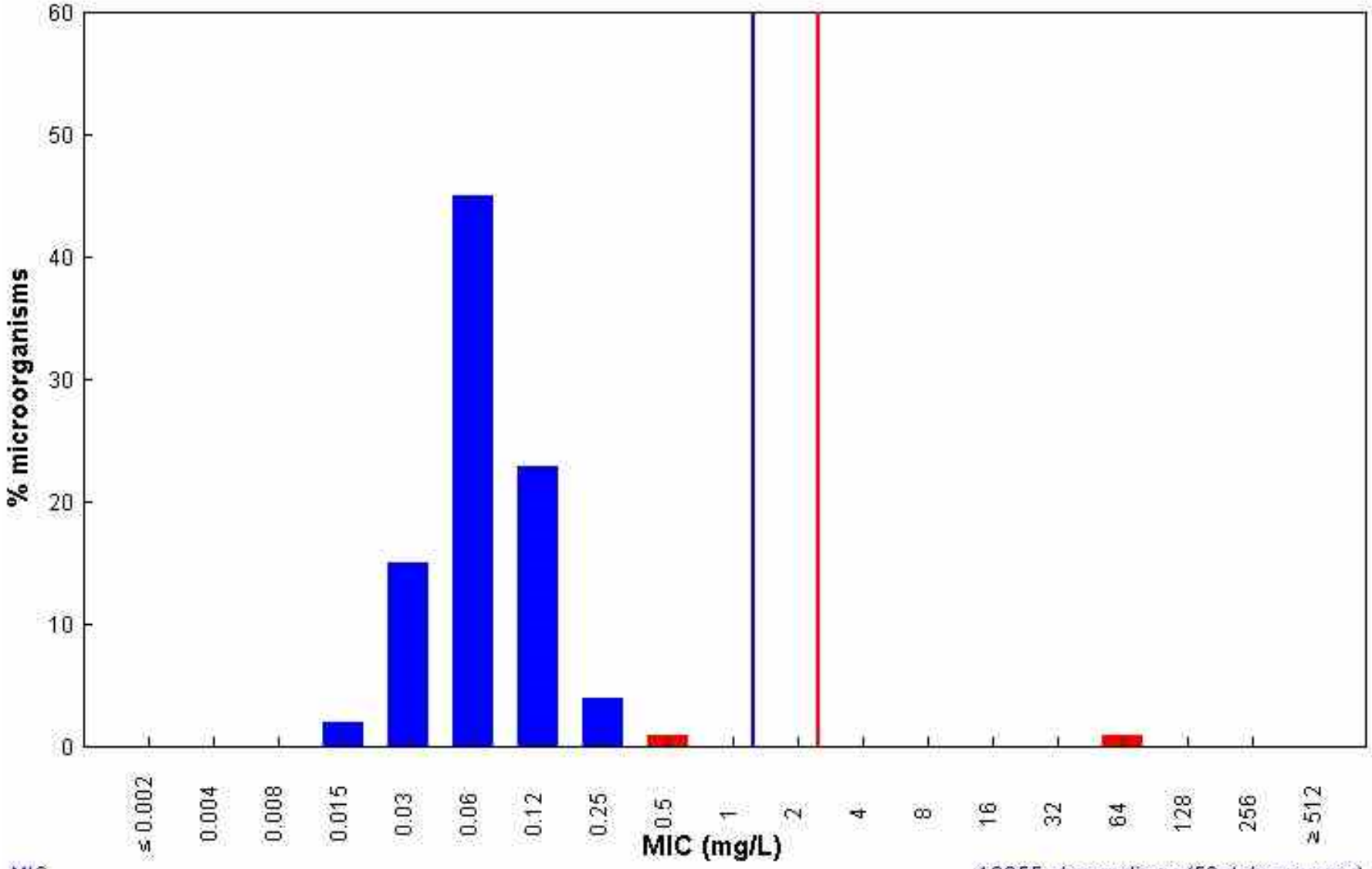
cefotaxime vs. *E.coli*		≤ S / R
BSAC	United Kingdom	2 / ≥ 4
CA-SFM	France	4 / > 32
CRG	The Netherlands	4 / > 16
DIN	Germany	2 / ≥ 16
NWGA	Norway	1 / ≥ 32
SRGA	Sweden	0.5 / ≥ 2

cefotaxime vs. *E.coli*		≤ S / R
EUCAST	EU	1 / 2
CLSI	USA	8 / ≥ 64

Cefotaxime / Escherichia coli

EUCAST MIC Distribution - Reference Database 2013-03-06

MIC distributions include collated data from multiple sources, geographical areas and time periods and can never be used to infer rates of resistance



MIC

Epidemiological cut-off: WT ≤ 0.25 mg/L

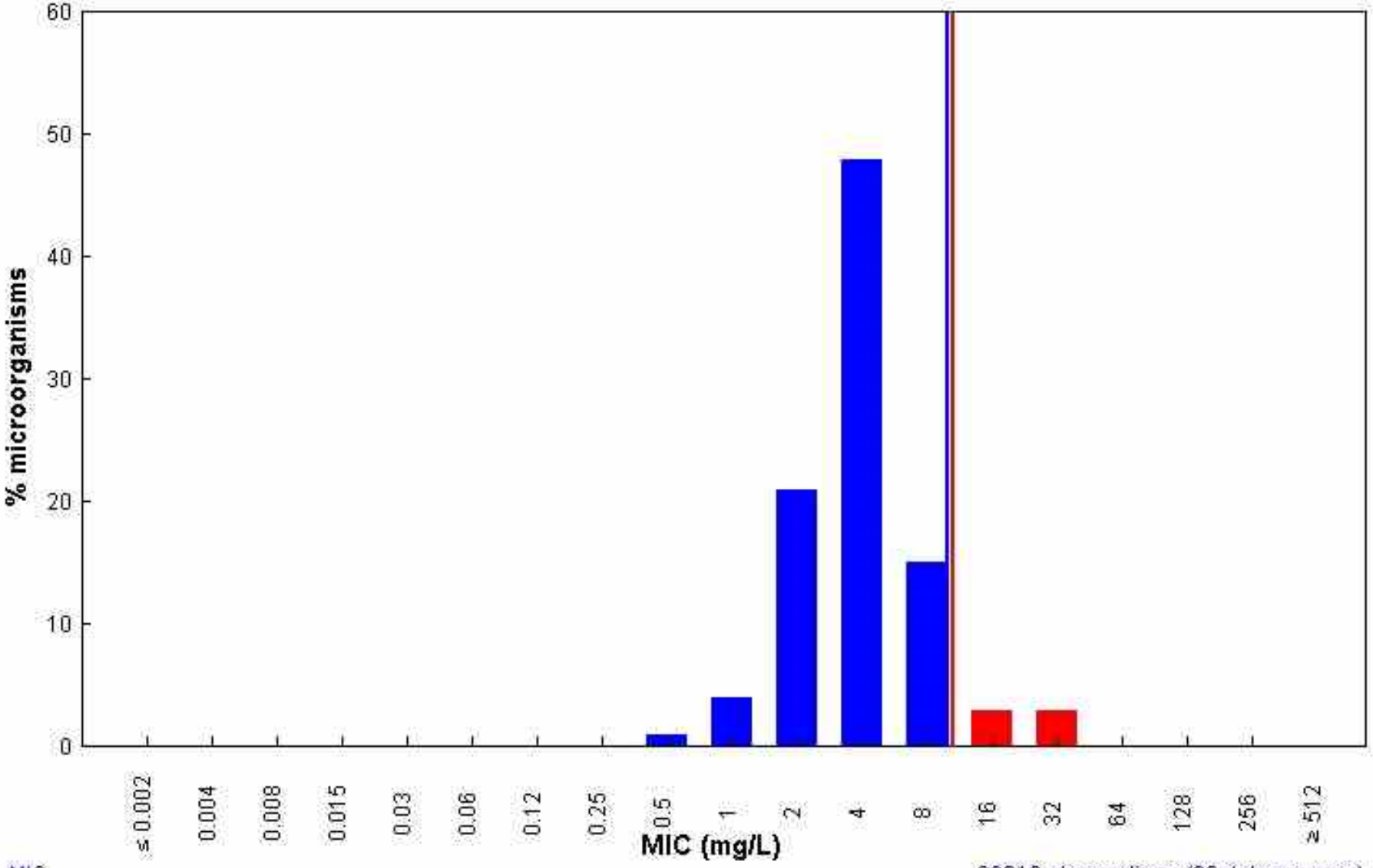
10855 observations (58 data sources)

Clinical breakpoints: S ≤ 1 mg/L, R > 2 mg/L

Cefuroxime / Escherichia coli

EUCAST MIC Distribution - Reference Database 2013-03-06

MIC distributions include collated data from multiple sources, geographical areas and time periods and can never be used to infer rates of resistance

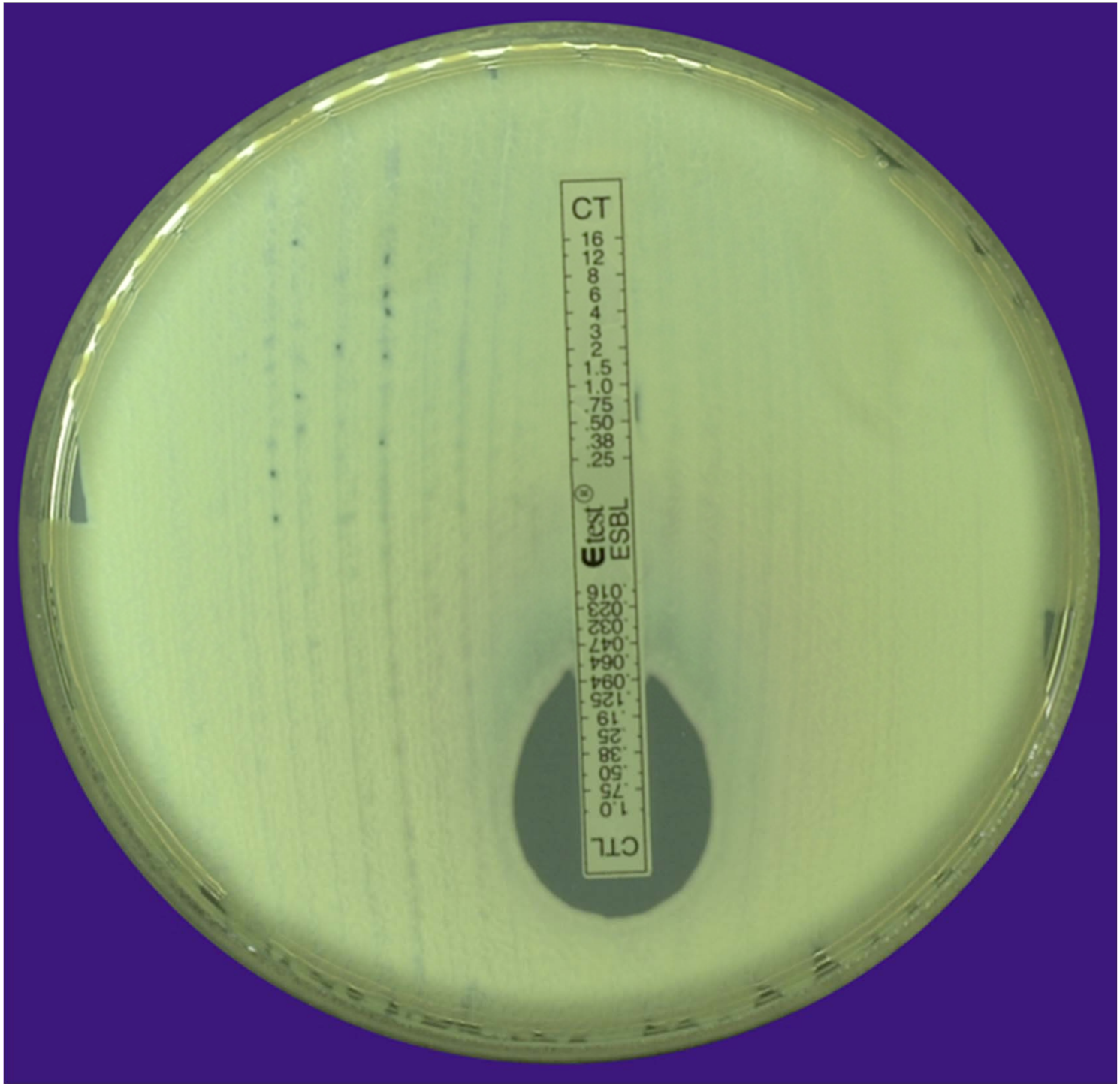


MIC

Epidemiological cut-off: WT ≤ 8 mg/L

96016 observations (30 data sources)

Clinical breakpoints: S ≤ 8 mg/L, R > 8 mg/L


CT
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E test ESBL
.016
.023
.032
.047
.064
.094
.125
.19
.25
.38
.50
.75
1.0
CTL

ESBL

- gelten als resistent gegenüber den meisten Penicillinen und Cephalosporinen (enzymatische Spaltung = *extended spectrum ß-lactamase*, verschiedene Typen)
  - Cefotaxim/Ceftriaxon manchmal unterschiedlich zu Ceftazidim, oft unterschiedlich zu Cefepim
  - Starker Inokulum-Effekt
  - Ceph III° + Clav meistens aktiv

Detection of Favorable Oral Cephalosporin-Clavulanate Interactions by *In Vitro* Disk Approximation Susceptibility Testing of Extended-Spectrum-Beta-Lactamase-Producing Members of the *Enterobacteriaceae*

Jennifer D. Campbell,[a,b,c*] James S. Lewis II,[b,c,e] M. Leticia McElmeel,[d] Letitia C. Fulcher,[d] and James H. Jorgensen[d]

TABLE 2 Results of tests of cefpodoxime with and without the concomitant presence of amoxicillin-clavulanate (Amox-Clav) by broth dilution and disk diffusion testing

ESBL group (no. of isolates)	MIC tested alone						Cefpodoxime MIC tested with Amox-Clav[a]			% susceptible[b]	% detected by disk approximation[c]
	Cefpodoxime			Amox-Clav[d]							
	MIC_{50}[e]	MIC_{90}[f]	Range	MIC_{50}	MIC_{90}	Range	MIC_{50}	MIC_{90}	Range		
CTX-M (28)[g]	>32	>32	16–>32	16	32	4–>32	0.25	8	≤0.06–>32	89.3	100
SHV (17)[h]	>32	>32	2–>32	32	>32	4–>32	0.5	>32	≤0.06–>32	58.8	100
CTX-M + SHV (3)[i]	>32	>32	>32	32	>32	16–>32	1	>32	≤0.06–>32	66.7	100

J Clin Microbiol 2012

ESBL

- Amoxi+Clav (Amp+Sul) und Pip+Tazo können aktiv sein
- häufig auch resistent gegenüber
  - Fluorchinolone
  - Aminoglykoside
  - Cotrimoxazol

ESBL

- meist empfindlich gegenüber
  - Fosfomycin
  - Nitrofurantoin
  - Pivmecillinam
  - Nitroxolin
- Carbapeneme bei schweren Infektionen als Initialtherapie derzeit Mittel der Wahl

ESBL Trends weltweit

	2003	2004	2005	2006	2007
Asia/Pacific	**15%**	**14%**	**23%**	**28%**	**40%**
South America	**10%**	**12%**	**18%**	**23%**	**30%**
Middle East/ Africa	**8%**	**11%**	**16%**	**17%**	**17%**
Europe	**6%**	**3%**	**8%**	**9%**	**10%**
North America	**4%**	**1%**	**4%**	**8%**	**8%**

Source: SMART-Programme (Study for Monitoring Antimicrobial Resistance Trends) with collection of *E. coli, Klebsiella pneumoniae* und *K. oxytoca* from 74-94 laboratories since 2003

Badal *abstract* C1-131, ICAAC 2008

ESBL Trends Asien/Pazifikraum

- 2008, SMART
- Gram-negative bacilli associated with intra-abdominal infections
- CLSI
- ESBL+ *E. coli* + *Klebsiella pneumoniae*

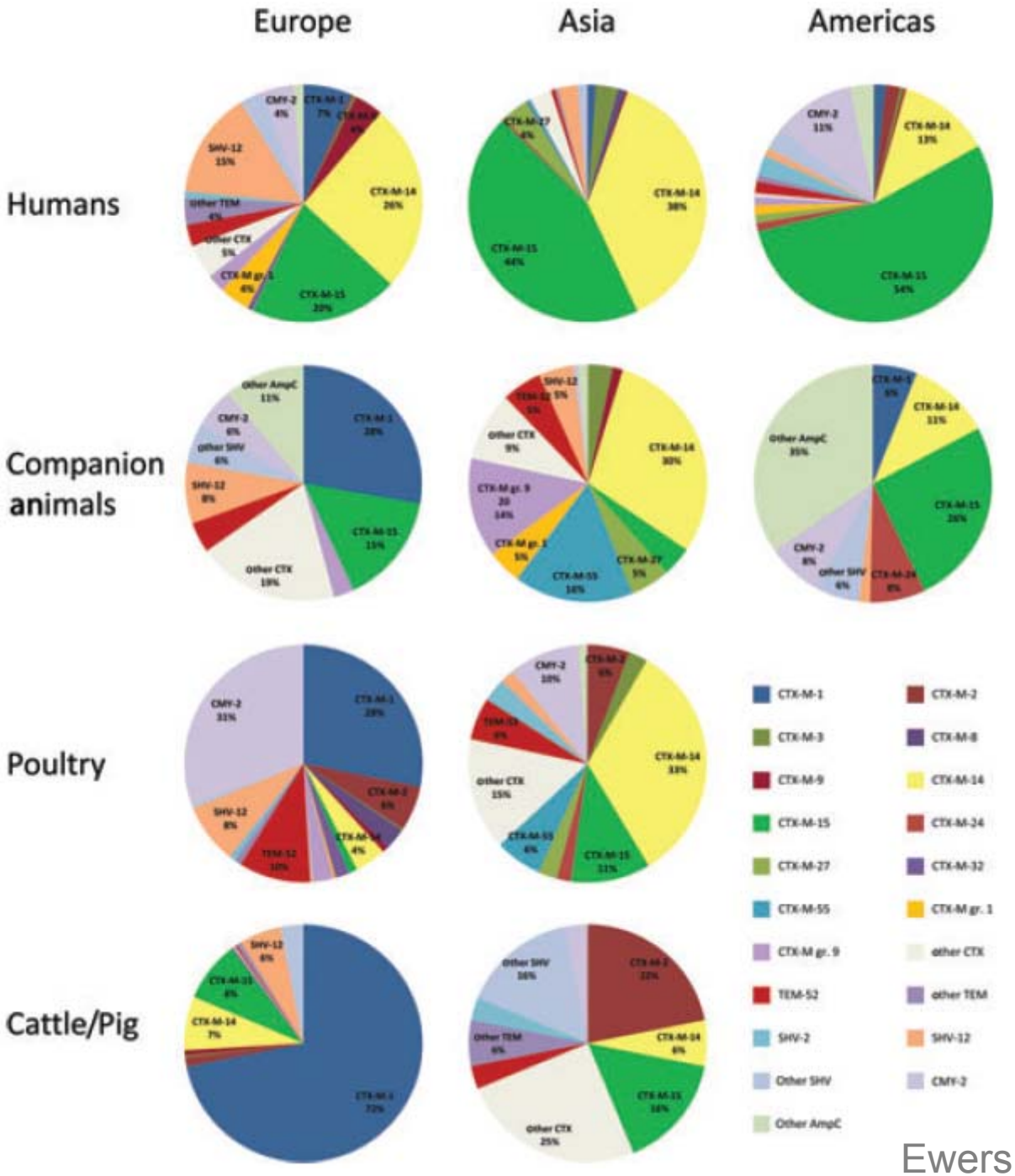
China	59%	34%
India	61%	47%
Thailand	53%	23%

- FQREC

Thailand	>50%
China	≥70%
India	>80%

Hsueh et al *Int J Antimicrob Agents* 2010

ESBL+/
AmpC+
E. coli



Ewers et al. *CMI* 2012

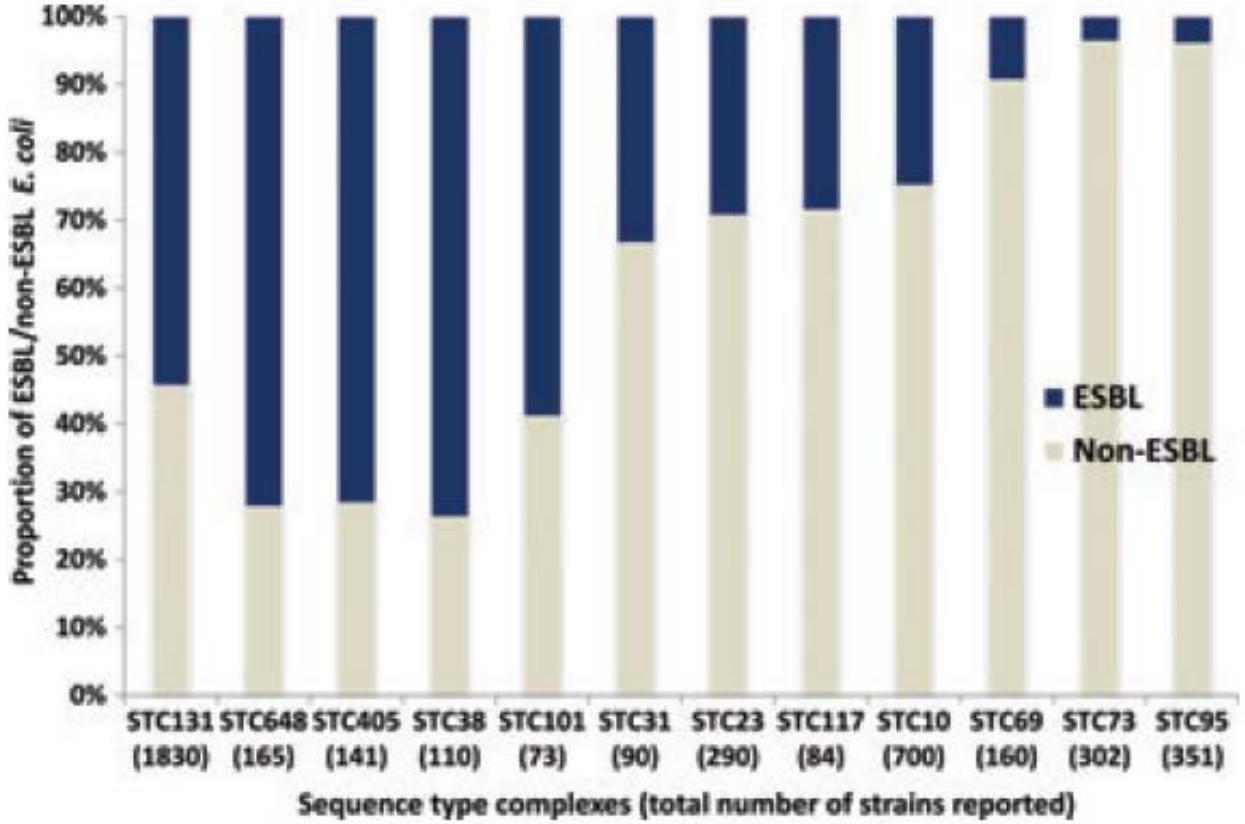


FIG. 4. Proportion (%) of extended-spectrum β-lactamase (ESBL)/AmpC/NDM-producing *Escherichia coli* among the total number of strains recorded among various sequence type complexes (STCs).

Ewers et al. *CMI* 2012

ESBL-“Erwerb“

- 242 Patienten mit Reisediarrhoe
- ESBL+ *E. coli*, *Klebsiella pneumoniae*, *Proteus mirabilis* bei 24% (58/242)
- Europa, 3% (2/63) vs RoW 36% (50/138)
  - Indien: 11/14 (79%)
  - Ägypten 19/38 (50%)
  - Thailand 8/38 (22%)

Tham et al *Scand J Infect Dis* 2010

ESBL Trends Afrika, z.B.

- Kamerun 2009
- Stuhlproben von 208 Patienten + 150 Gesunden
- ESBL+ 23% vs 7%
- Risikofaktor: Fluorchinolon-Vorbehandlung

Magoue-Lonchel et al *BMC Infect Dis* 2012

ESBL-Übertragung

- Adoptivkinder aus Mali (→Frankreich)
- Stuhlproben bei Ankunft sowie später in monatlichen Abständen
- Stuhlproben der Adoptiveltern und Familien-mitglieder
- Ergebnisse
  - ESBL bei 24/25 Adoptivkindern nachgewiesen
  - mehrheitlich *E. coli*, aber auch *Salmonella*
  - Kolonisationsdauer im Mittel 9 Monate
  - Übertragung intrafamiliär in 5/22 Familien (23%)

Tandé et al *JAC* 2010

Ceph III°-resistente *E.coli* hier

stationär:	10%
ambulant:	5%

Antibiotika Resistenz Surveillance

ABSFORTBILDUNG
antibiotic-stewardship.de

E.coli - alle Mat. – IM/Allg vs. Pädiater vs. Urologen vs stationär

E.coli	**R (%) Innere/Allg**	**R (%) Pädiater**	**R (%) Urologen**	**R (%) stationär**
Amoxi/Clav	22	15	24	31
Cefotaxim	5	3	6	10
FQ	18	4	24	22
Cotrim	29	22	32	31

Antibiotika Resistenz Surveillance

ABSFORTBILDUNG
antibiotic-stewardship.de

ESBL: Optionen ?

- Carbapenem
- ?? einige sind in vitro empfindlich auf Amoxi/Clav bzw. Pip/Tazo

β-Lactam/β-Lactam Inhibitor Combinations for the Treatment of Bacteremia Due to Extended-Spectrum β-Lactamase–Producing *Escherichia coli*: A Post Hoc Analysis of Prospective Cohorts

Jesús Rodríguez-Baño,[1,2] María Dolores Navarro,[1] Pilar Retamar,[1] Encarnación Picón,[1] Álvaro Pascual,[1,3] and the Extended-Spectrum Beta-Lactamases–Red Española de Investigación en Patología Infecciosa/Grupo de Estudio de Infección Hospitalaria Group[a]

CID 2012

Characteristic	Empirical Therapy Cohort		
	BLBLI (n = 72)	Carbapenem (n = 31)	*P*
Age, median y (IQR)	69 (59–80)	60 (52–78)	.1[b]
Male sex	29 (40.3)	11 (35.5)	.6
Nosocomial acquisition	26 (36.1)	24 (77.4)	<.001
Charlson index, median, (IQR)	2 (1–5)	2 (1–5)	.6[b]
Cancer	21 (31.9)	11 (35.5)	.7
Immunosuppression	5 (6.9)	5 (16.1)	.1[c]
Neutropenia	2 (2.8)	3 (9.7)	.1[c]
Urinary or biliary tract as source	52 (72.2)	18 (58.1)	.1
ICU admission	7 (9.9)	2 (6.7)	.7[c]
Severe sepsis or shock at presentation	14 (19.4)	9 (29.0)	.2
Pitt score, median (IQR)	1 (0–2)	1 (0–2)	.7[b]
CTX-M enzyme	57 (80.3)	25 (86.2)	.4
Definitive therapy			
Carbapenem	32 (44.4)	30 (93.7)	<.001
BLBLI	34[d] (47.2)	0	<.001
Empirical therapy			
Carbapenem	…	…	…
BLBLI	…	…	…
Cephalosporins	…	…	…
Fluoroquinolones	…	…	…
Appropriate empirical therapy	…	…	…
Mortality, no. of deaths			
Day 7	2 (2.8)	3 (9.7)	.1[c]
Day 14	7 (9.7)	5 (16.1)	.3
Day 30	7 (9.7)	6 (19.4)	.1
Hospital stay after BSI , median (IQR), d	12 (8–28)	13 (9–25)	.7[b]

Characteristic	Definitive Therapy Cohort		
	BLBLI (n = 54)	Carbapenem (n = 120)	*P*
Age, median y (IQR)	67 (56–83)	70 (55–78)	.3[b]
Male sex	34 (63)	70 (58.3)	.5
Nosocomial acquisition	18 (33.3)	67 (55.8)	.006
Charlson index, median, (IQR)	2.5 (1–5)	3 (1–5)	.5[b]
Cancer	15 (27.8)	43 (35.8)	.2
Immunosuppression	3 (5.6)	15 (12.5)	.1
Neutropenia	0	7 (5.8)	.1[c]
Urinary or biliary tract as source	42 (77.8)	79 (65.8)	.1
ICU admission	4 (7.4)	18 (15.4)	.1
Severe sepsis or shock at presentation	8 (14.8)	32 (26.7)	.08
Pitt score, median (IQR)	1 (0–2)	1 (1–2)	.04[b]
CTX-M enzyme	43 (82.7)	95 (81.2)	.8
Definitive therapy			
Carbapenem	…	…	…
BLBLI	…	…	…
Empirical therapy			
Carbapenem	0	30 (25)	<.001
BLBLI	45[d] (83.3)	38 (31.7)	<.001
Cephalosporins	7 (13)	39 (32.5)	.006
Fluoroquinolones	2 (3.7)	13 (10.8)	.1[c]
Appropriate empirical therapy	34 (63)	64 (53.3)	.2
Mortality, no. of deaths			
Day 7	1 (1.9)	5 (4.2)	.6[c]
Day 14	3 (5.6)	14 (11.7)	.2
Day 30	5 (9.3)	20 (16.7)	.1
Hospital stay after BSI , median (IQR), d	13 (8–22)	13 (10–25)	.04[b]

Characteristic	Definitive Therapy Cohort		
	BLBLI (n = 54)	Carbapenem (n = 120)	*P*
Age, median y (IQR)	67 (56–83)	70 (55–78)	.3[b]
Male sex	34 (63)	70 (58.3)	.5
Nosocomial acquisition	18 (33.3)	67 (55.8)	.006
Charlson index, median, (IQR)	2.5 (1–5)		
Cancer			
		13 (10.8)	.1[c]
empirical therapy	34 (63)	64 (53.3)	.2
Mortality, no. of deaths			
Day 7	1 (1.9)	5 (4.2)	.6[c]
Day 14	3 (5.6)	14 (11.7)	.2
Day 30	5 (9.3)	20 (16.7)	.1
Hospital stay after BSI , median (IQR), d	13 (8–22)	13 (10–25)	.04[b]

Table 4. Cox Regression Analysis of Associations Between Different Variables and Mortality in the Definitive Therapy Cohort

Variable	Crude Analysis		Adjusted Analysis	
	HR (95% CI)	*P*	HR (95% CI)	*P*
Male sex	1.2 (.46–2.29)	.9	…	…
Age[a]	1.00 (.97–1.02)	.9	…	…
Nosocomial BSI	0.99 (.45–2.22)	.9	…	…
Charlson index[a]	1.02 (.88–1.28)	.7	…	…
Neutropenia	1.78 (.88–13.32)	.5	…	…
High-risk source[b]	2.07 (.94–4.54)	.06	1.38 (1.12–1.70)	.002
Pitt score[a]	1.49 (1.26–1.78)	<.001	2.10 (.87–5.05)	.09
Severe sepsis or shock[c]	3.64 (1.66–7.99)	.001	…	…
Empirical therapy with BLBLI	0.56 (.18–1.73)	.3	…	…
Inappropriate empirical therapy	1.76 (.78–3.93)	.1	0.76 (.28–2.07)	.5
Definitive therapy with BLBLI[d]	0.66 (.24–1.76)	.4		

Abbreviations: BLBLI, β-lactam/β-lactamase inhibitor association; BSI, bloodstream infection; CI, confidence interval; HR, hazard ratio.

ESBL: Optionen ?

- Carbapenem
- ! Amoxi/Clav oder Pip/Tazo (nach Austestung)

ESBL: Optionen ?

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- ! Amoxi/Clav oder Pip/Tazo (nach Austestung)
- ?? Cephalosporin + ßLI

Orthodox and unorthodox clavulanate combinations against extended-spectrum β-lactamase producers

D. M. Livermore, R. Hope, S. Mushtaq and M. Warner

Antibiotic Resistance Monitoring and Reference Laboratory, Health Protection Agency, Centre for Infections, London, UK

possible to launch a drug combination in India—a fast-developing country with one-sixth of the world's population—on the basis of what, in the West, would count as phase II data. Ceftriaxone–sulbactam is marketed on this basis by at least one local company (Ceftrimax, VHB Group, Mumbai, http://www.vhbgroup.com). Whilst, in the period between the Venice meeting and publication of this supplement, Ranbaxy (http://www.ranbaxy.com) have launched a cefepime-tazobactum combination. It will be intriguing to see the clinical results against ESBL producers and, if these are positive, the reactions of both western microbiologists and companies!

ESBL: Optionen ?

- Carbapenem
- ! Amoxi/Clav oder Pip/Tazo (nach Austestung)
- ? Cephalosporin + ßLI
- ….
- ? Tigecycline *iv*
- ? Colistin *iv*
- Azithromycin (bei *Salmonella*)

ESBL: Optionen orale Therapie ?

- Orale Therapie (UTI)
  - ? Fosfomycin *po* 95%
  - ? Nitrofurantoin *po* 90%
  - ? Nitroxolin *po* 90%
  - ? Pivmecillinam *po* 85%

  } in vitro-Empfindlichkeit

  - ? Cefpodoxim+(Amoxi-)Clav

SELEXID®

pivmecillinam

Selexid-Filmtabletten. **Zulassungsinhaber:** LEO Pharma, Wien. **Hersteller:** LEO Pharmaceutical Products, Ballerup, Dänemark. **Zusammensetzung:** 1 Filmtablette enthält 200 mg Pivmecillinam-hydrochlorid. **Anwendungsgebiete:** Selexid kann bei Infektionen mit Mecillinam-empfindlichen Erregern eingesetzt werden, wie bei: Infektionen der Harnwege: akute Cystitis, Pyelitis, Pyelonephritis; chronische oder rezidivierende Harnwegsinfekte; postoperative Bakteriurie nach urologischen und gynäkologischen Eingriffen; symptomatische oder asymptomatische Bakteriurie in der Schwangerschaft; Salmonellosen, Shigellosen; als Alternative zur antibiotischen Behandlung des Typhus abdominalis; zur Sanierung von Salmonellenausscheidern; Enteritiden durch andere Mecillinam-empfindliche Bakterien

2 x 2 Tabl. à 200 mg 3 Tage

Spektrum und MHK-Werte (mg/l):

Keim	MHK $_{50}$ (mg/l)	MHK $_{90}$ (mg/l)
Staphylococcus saprophyticus	16[17]	32[17]
Streptococcus pyogenes	0,5[3]	2[16]
Neisseria gonorrhoeae		0,1[16]
Haemophilus influenzae		16[16]
Escherichia coli	0,12[17]	0,25[17]
Enterobacter cloacae	0,25[17]	2[17]
Proteus mirabilis	1[17]	2[17]
Proteus inconstans (Providencia)	1[17]	> 128[17]
Salmonella typhi	0,8[15]	1[16]
Shigella dysenteriae	0,8[15]	0,8[16]
Yersinia enterocolitica		< 2[6]

ESBL: Optionen orale Therapie ?

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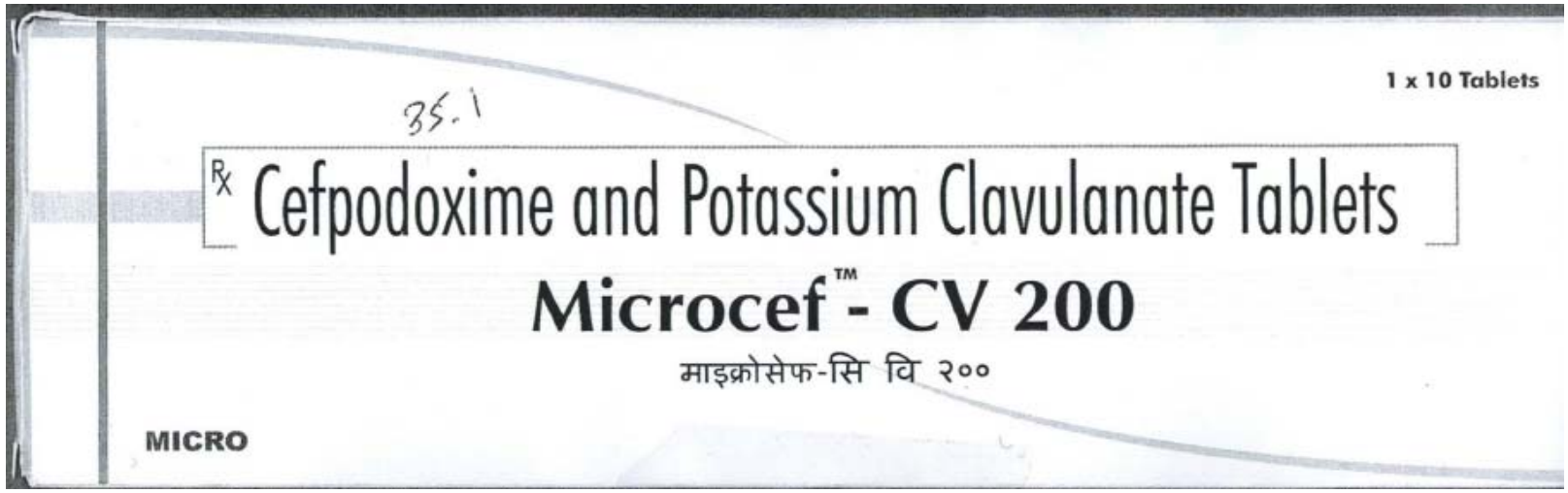
  } in vitro-Empfindlichkeit

  - ? Cefpodoxim+(Amoxi-)Clav



1 x 10 Tablets

35.1

℞ Cefpodoxime and Potassium Clavulanate Tablets

Microcef™ - CV 200

माइक्रोसेफ-सि वि २००

MICRO

Each film-coated tablet contains:

Cefpodoxime Proxetil IP equivalent to Cefpodoxime	200 mg
Potassium Clavulanate Diluted IP equivalent to Clavulanic Acid	125 mg

Colour : Titanium Dioxide IP

Dosage : As directed by the Physician.

Keep in a dry place, below 25°C

"SCHEDULE H DRUG-WARNING: To be sold by retail on the Prescription of a Registered Medical Practitioner only."

Made in India by :

MICRO LABS LIMITED*

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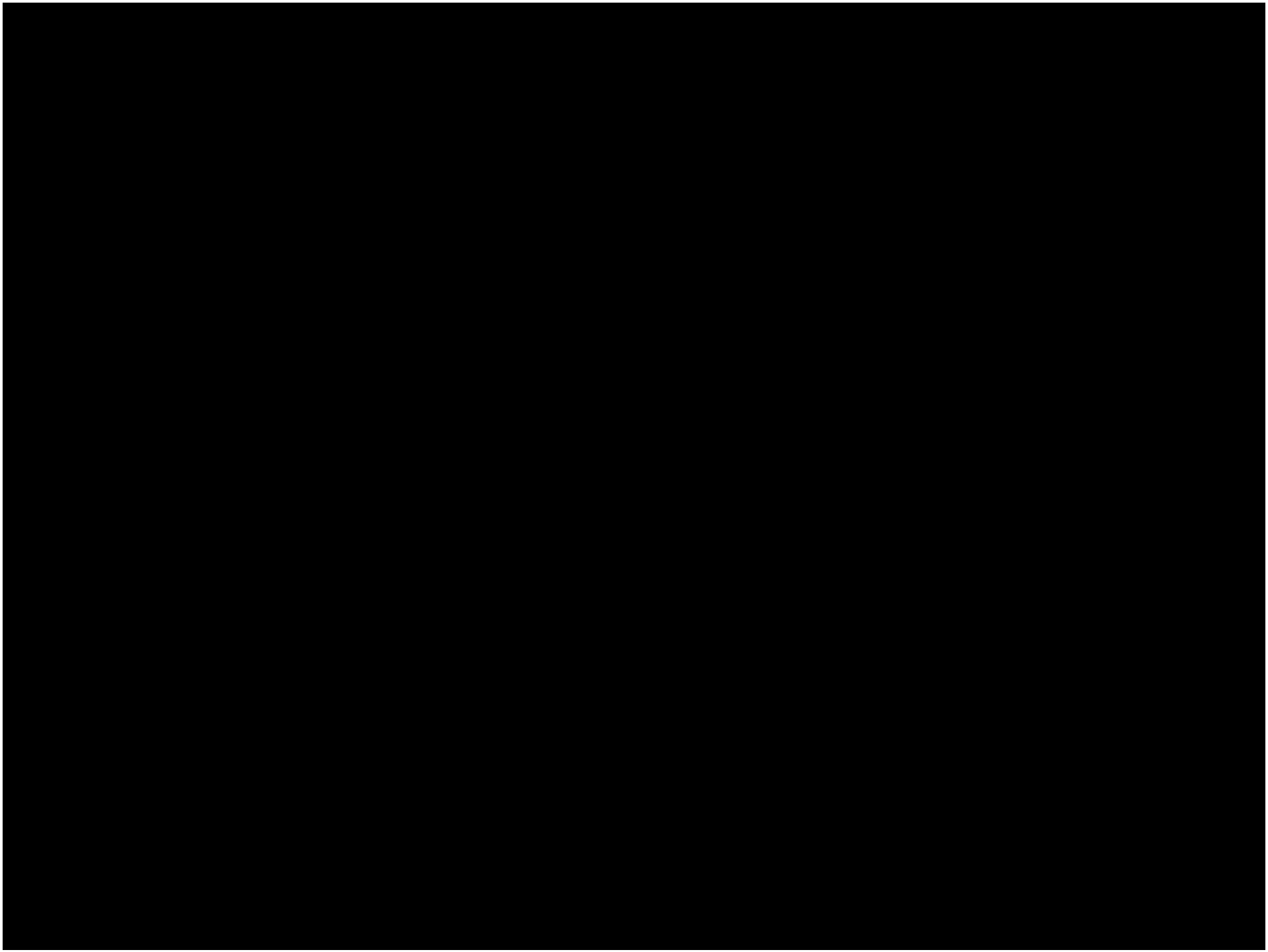
Batch No. : MVTB 0047

Mfg. Date : JUL . 2012

Expiry Date : DEC . 2013

Maximum Retail Price for 10 tablets Rs. 218 . 00
Inclusive of all taxes.

ESBL+ *Enterobacteriaceae*: Dekolonisierung ??



danke für´s Zuhören