

# Was ist schlimmer MRSA oder MSSA Bakteriämie?

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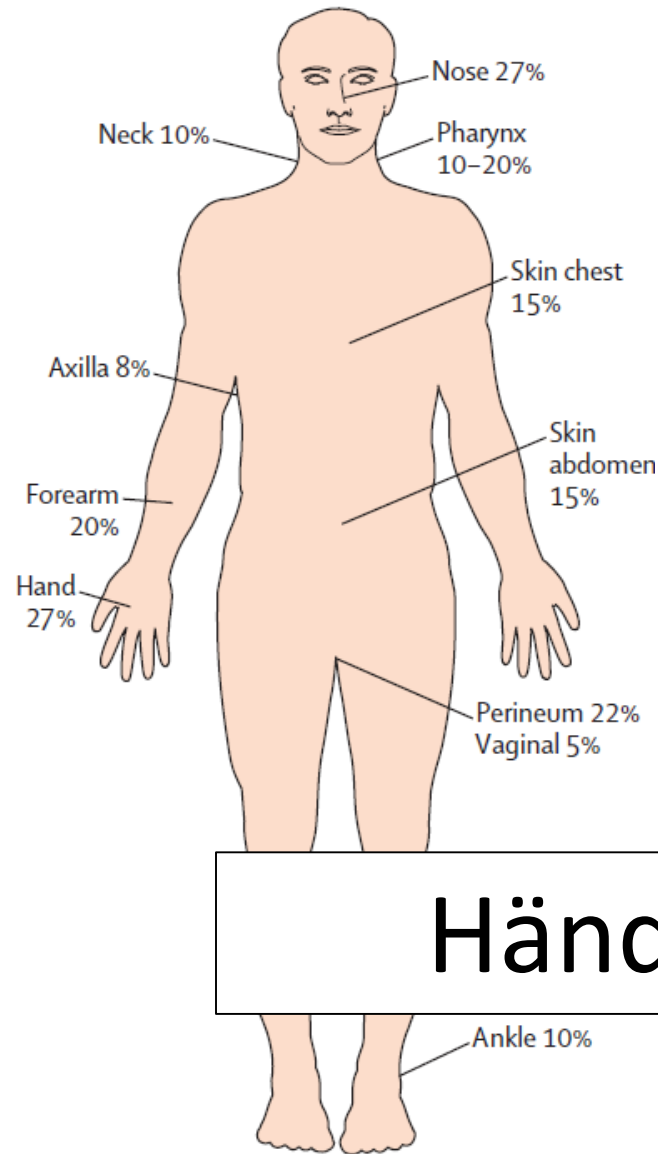
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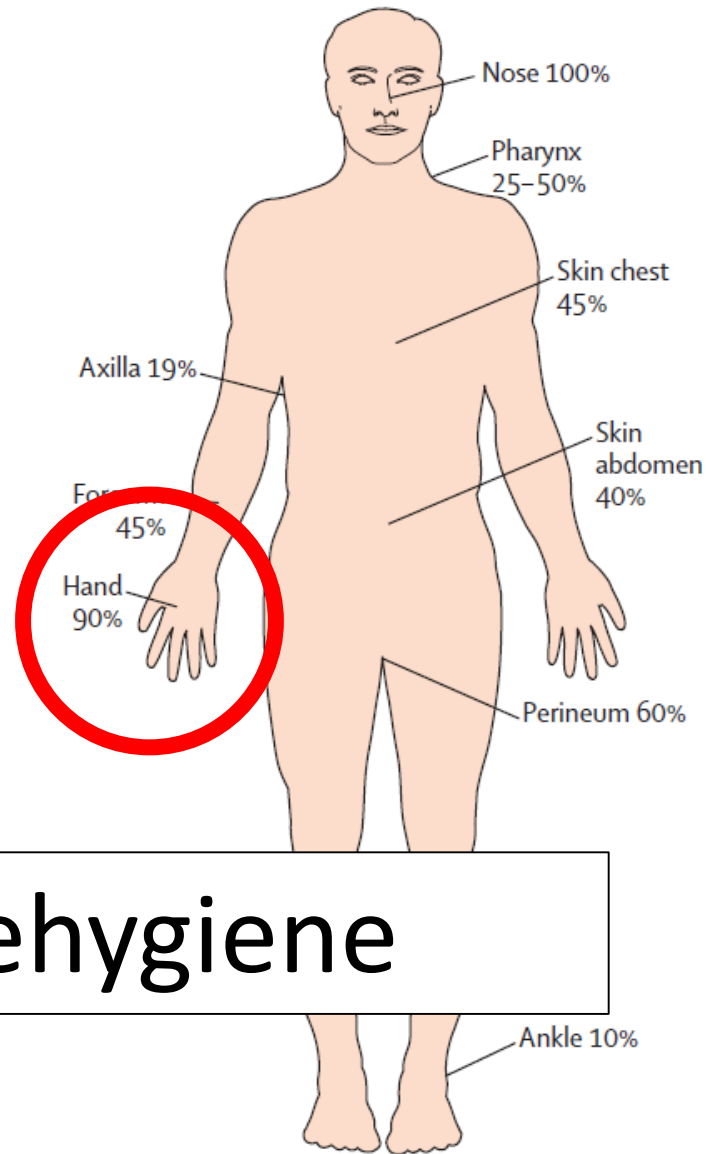
# *Staphylococcus aureus*

- Besiedelt Säugetiere
- Relativ umweltresistent
- Haut-Weichteilinfektionen
- Tiefe Infektionen
- Biofilm
- Methicillin-Resistenz

## Allgemeinbevölkerung



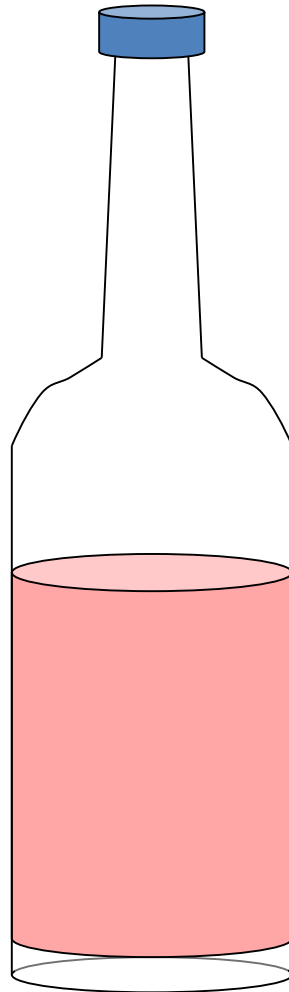
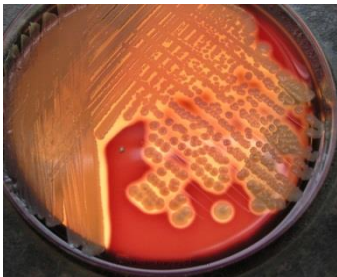
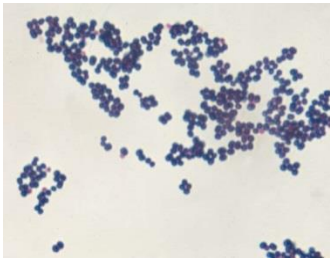
## *S. aureus* Träger



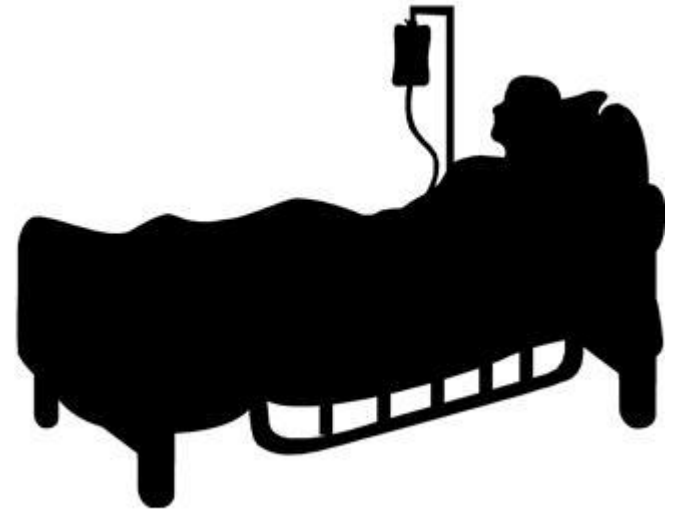
# Händehygiene

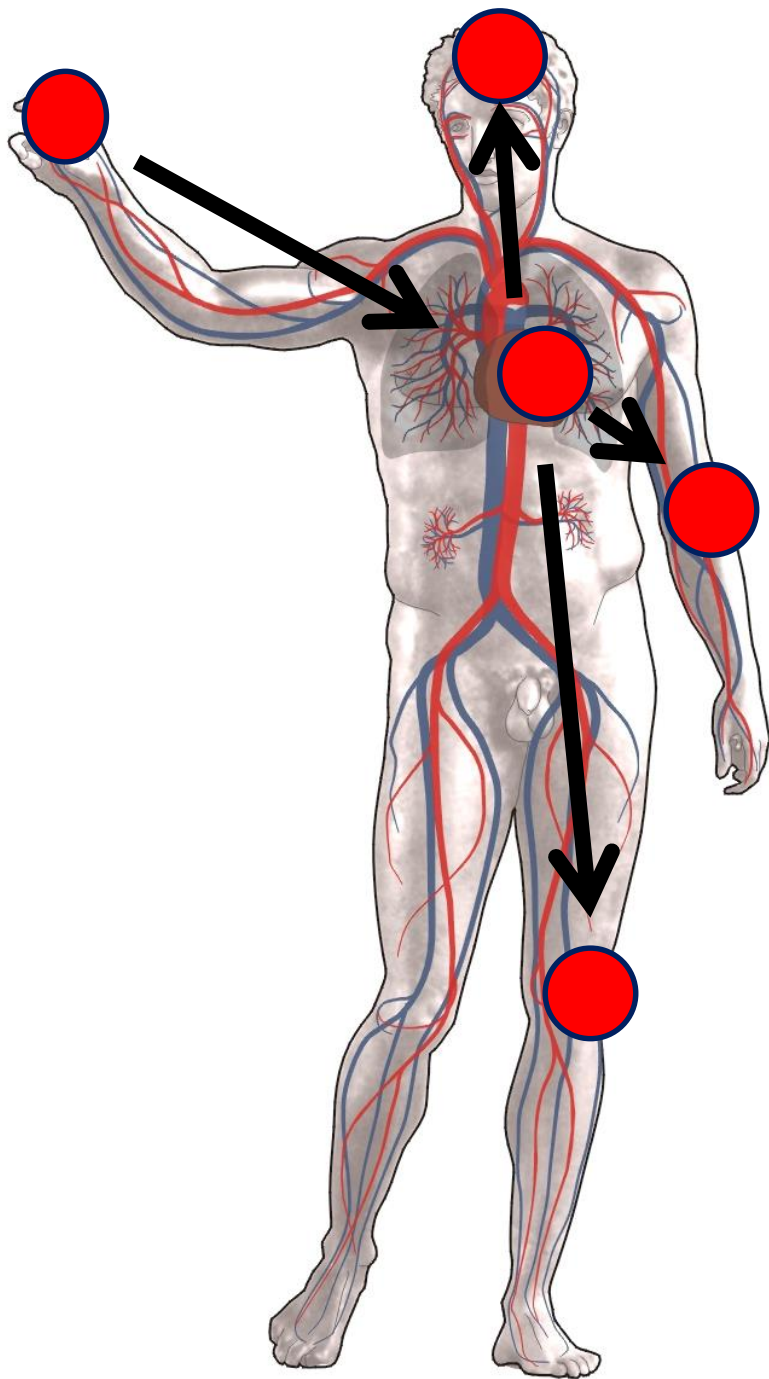
# Blutkultur

Bakteriämie



Blutstrominfektion





Splitter  
Endokarditis  
Stroke  
Empyem

- Fokussuche
- invasive Maßnahmen
- antimikrobielle Therapie
- 90d-Sterblichkeit: ca. 30%

Was ist schlimmer MRSA oder MSSA  
Bakteriämie?

TABLE 4 Summary of studies that have examined the impact of methicillin resistance on mortality in *Staphylococcus aureus* bacteremia<sup>a</sup>

Study	No. of MRSA isolates/no. of MSSA isolates	Mortality rate for MRSA vs MSSA (%)	Mortality risk for MRSA vs MSSA	Adjustment(s) for confounders	Reference
<b>Meta-analyses</b>					
Meta-analysis of 9 studies (1990–2000); mortality	778/1,431	29 vs 12	Pooled RR, 2.03 (95% CI, 1.55–2.65; $P < 0.001$ )	None	317
Meta-analysis of 31 studies (1980–2000); mortality	1,360/2,603	Not stated	Pooled OR, 1.93 (95% CI, 1.54–2.42; $P < 0.03$ )	Varied between studies analyzed	42
<b>Studies that found MRSA to be an independent predictor of mortality (multivariate analysis)</b>					
Single-center retrospective Taiwanese study (1990–2004); 30-day mortality	851/297	49.8 vs 27.6	OR, 1.78 (95% CI, 1.3–2.44; $P < 0.001$ )	None	308
Single-center retrospective Belgian study (1992–1998); 30-day mortality	47/38	63 vs 18	HR, 1.93 (95% CI, 1.18–3.18; $P < 0.01$ )	None	18
Multicenter retrospective U.S. study (1995–2003); 90-day infection-related	184/235	34.2 vs 19.6	HR, 1.8 (95% CI, 1.2–3.0; $P < 0.01$ )	Patients with pneumonia	266

„The majority of studies report an increased mortality rate associated with MRSA bacteremia“

→ Meldepflicht

Single-center retrospective Canadian study (1991–2005); 30-day mortality	69/740	35 vs 25	OR, 2.21 (95% CI, 0.99–4.96; $P$ value ND)	Age, gender, comorbidities, residence, absence of treatment, site of infection	5
Single-center prospective United Kingdom study (1995–2000); infection-related mortality	382/433	29.6 vs 13.6	OR, 1.72 (95% CI, 0.92–3.2; $P = 0.09$ )	Age, hospital specialty, primary site of infection	195
Single-center retrospective French study (1997–1998); infection-related mortality	30/69	43.3 vs 20.3	OR, 2.8 (95% CI, 0.99–7.1; $P$ value ND)	Appropriate treatment within the first 72 h	286
Single-center prospective U.S. study (1997–2000); in-hospital mortality	96/252	22.9 vs 19.8	OR, 0.72 (95% CI, 0.39–1.96; $P = 0.45$ )	None	41
Multicenter retrospective United Kingdom study (1997–2004); 30-day mortality	227/214	34.0 vs 27.0	OR, 1.49 (95% CI, 0.99–2.26; $P$ value ND)	None	322
Single-center retrospective Brazilian study (2000–2001); infection-related mortality	61/50	54.9 vs 24.7	HR, 3.52 (95% CI, 0.96–6.60; $P = 0.06$ )	Adequacy of therapy, gender, age, severity of clinical status and underlying illness	89
Single-center prospective Taiwanese study (2001–2006); 30-day all-cause mortality	30/185	10.0 vs 13.2	OR, 0.74 (95% CI, 0.22–2.45; $P$ value ND)	None	310
Multicenter prospective Asian study (2004–2006); 30-day mortality	2007/1701	16.2 vs 10.8	Not stated	Age, comorbidities, source of infection, health care onset	134
Single-center retrospective U.S. study (2004–2008); patients $\geq 80$ yr of age; in-hospital mortality	46/30	34.8 vs 20.0	OR, 2.1 (95% CI, 0.7–6.3; $P = 0.16$ )	None	15
Multicenter prospective Australian study (2007–2008); 30-day all-cause mortality	450/1,415	30.0 vs 17.7	OR, 1.04 (95% CI, 0.58–1.86; $P = 0.89$ )	None	296

Van Hal CMR 2012, 25 (2)

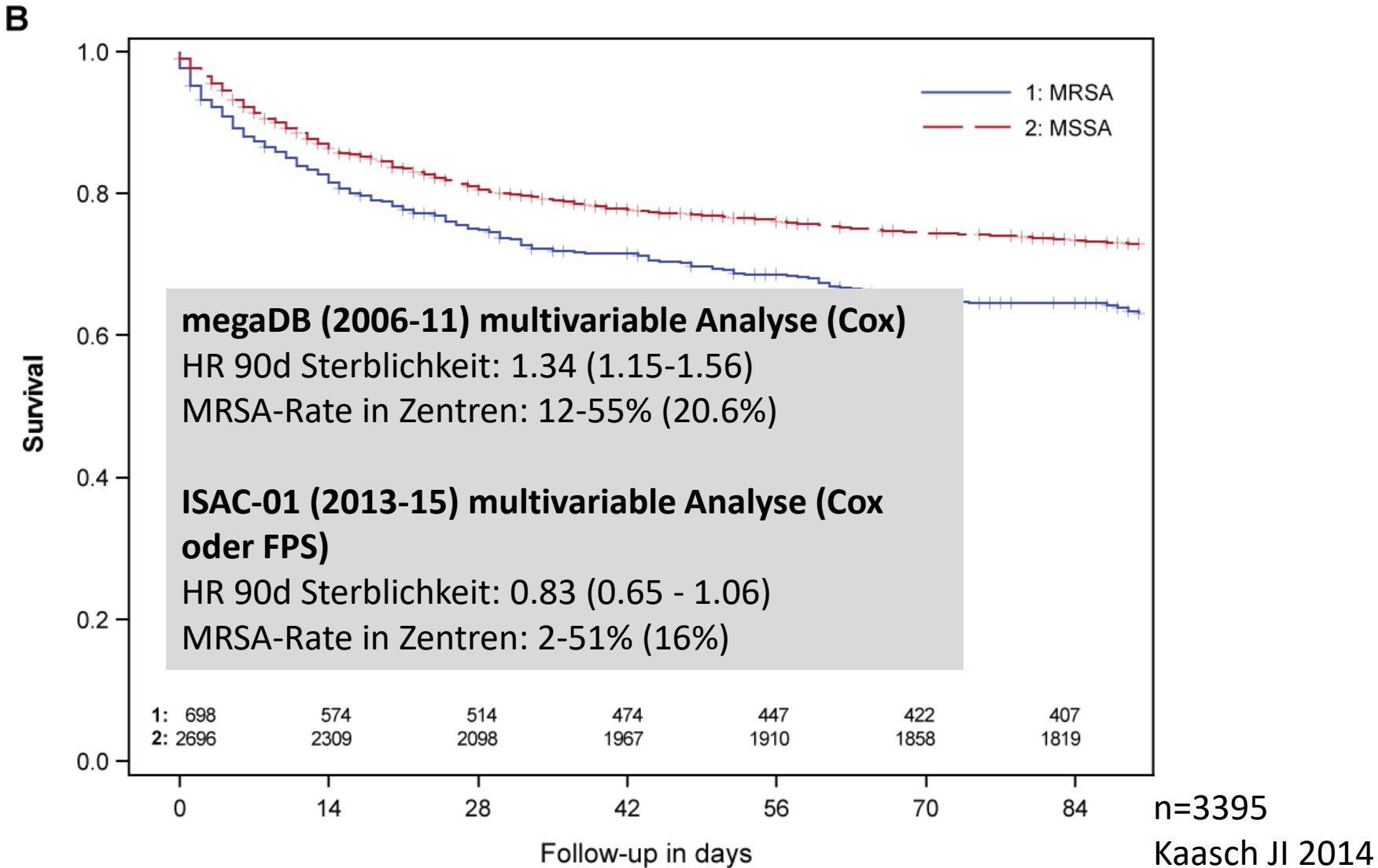
<sup>a</sup> Only studies post-2000 and not included in the meta-analyses by Cosgrove et al. (42) and Whitby et al. (317) are represented. MRSA, methicillin-resistant *S. aureus*; MSSA, methicillin-sensitive *S. aureus*; OR, odds ratio; CI, confidence interval;  $P$ ,  $P$  value; ND, not described.

# Schlechteres Überleben bei MRSA

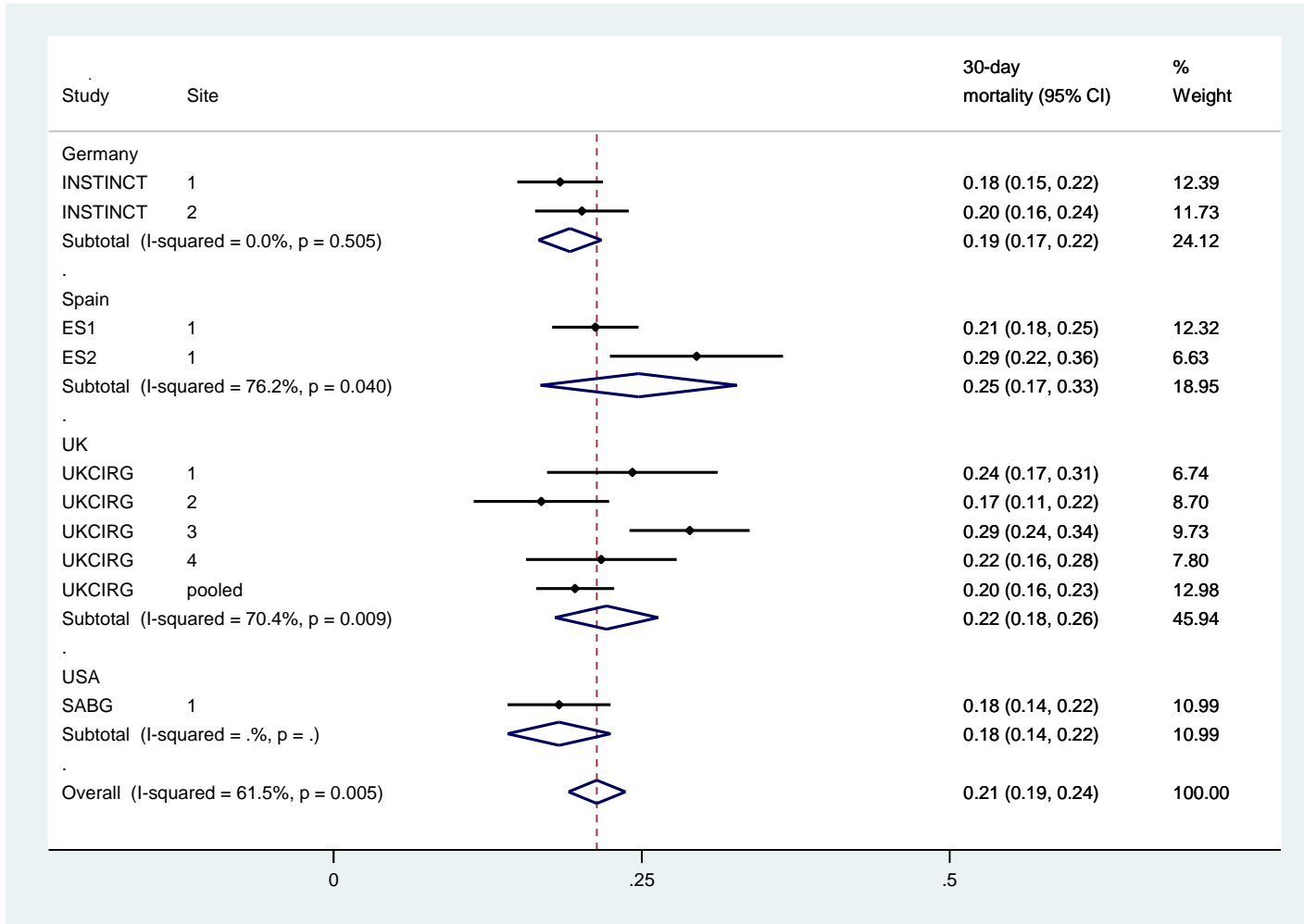
- Grunderkrankungen
- Pathogenere Stämme (?)
- Verzögerte Antibiotika-Gabe (?)
- „Schlechtere“ Antibiotika (Vancomycin)
- erschwerte Pflege und Diagnostik



# MRSA vs. MSSA (megaDB)



# Unterschiede zwischen Zentren bei der 30d-Sterblichkeit (megaDB)



# Qualitätsunterschiede zwischen Zentren?

Centre**	Day 0-90 Mortality (Univariable CPH Model)		Day 0-90 Mortality (Multivariable CPH Model)		Day 0-90 Mortality (Multivariable FPS Model)	
	Hazard Ratio (95% CI)	p-value	Hazard Ratio (95% CI)	p-value	Hazard Ratio (95% CI)	p-value
	0.72 (0.51-1.03)	0.069	0.58 (0.4-0.86)	0.006	0.53 (0.1 - 2.68)	0.443
	0.65 (0.47-0.89)	0.008	0.76 (0.54-1.07)	0.113	0.47 (0.08 - 2.64)	0.389

Sterblichkeit als Messgröße für die Qualität ist irreführend und nicht praxistauglich

# Zusammenfassung

- MRSA und MSSA sind „gleich schlimm“
- Eine Fokussierung auf MRSA allein ist langfristig nicht zielführend
- Sterblichkeitsunterschiede zwischen Zentren sind messbar
- Sterblichkeitsunterschiede sind stark von der Population beeinflusst und eignen sich daher nicht zur Beurteilung der Versorgungsqualität