Burden of Antimicrobial Resistance in Japan: A Systematic Literature Review and Meta-Analysis

Authors: Tetsuya Matsumoto[1], Akira Yuasa[2], Hiroyuki Matsuda[3], Dilinuer Ainiwaer[3], Naohiro Yonemoto[2]

Author Affiliations:

[1]Department of Infectious Diseases, School of Medicine, International University of Health and Welfare, Narita, Japan

[2]Health & Value, Pfizer Japan Inc., Tokyo, Japan

[3]Real World Evidence Solutions & HEOR, IQVIA Solutions Japan K.K., Tokyo, Japan

Corresponding author:

Name: Akira Yuasa

Address: Pfizer Japan Inc., Shinjuku Bunka Quint Building, 3-22-7, Yoyogi, Shibuya-ku, Tokyo 151-8589, Japan

Email: akira.yuasa@pfizer.com

Tel: +81-80-5001-3396

ORCID ID: https://orcid.org/0000-0002-3699-7231

Supplementary Tables

Supplementary Figure

Supplementary Table 1: Literature database search strategies

1. Search strategies for Embase and Ovid MEDLINE

Database(s): Embase 1974 to 2022 September 30, Ovid MEDLINE(R) ALL 1946 to September 30, 2022, Search Strategy:

#	Searches	Results
1	exp antimicrobial drug resistance/	375,523
2	exp antibiotic/ and resist*.ti,ab,kw.	442,661
3	exp antimicrobial/ and resist*.ti,ab,kw.	475,558
4	(exp Acinetobacter/ or exp Aspergillus fumigatus/ or exp Bacteroides fragilis/ or exp Campylobacter/ or exp Candida/ or exp Clostridioides difficile/ or exp enterobacteriaceae/ or exp enterobacterales/ or exp enterococcus/ or exp haemophilus influenzae/ or exp helicobacter pylori/ or exp Mycobacterium tuberculosis/ or exp Mycoplasma genitalium/ or exp Neisseria gonorrhoeae/ or exp nontuberculous mycobacteria/ or exp Pseudomonas aeruginosa/ or exp Salmonella/ or exp Shigella/ or exp Staphylococcus aureus/ or exp Streptococcus pneumoniae/ or exp Streptococcus Group A/ or exp Streptococcus Group B/) and (susceptib* or nonsusceptib* or resist*).ti,ab,kw.	444,639
5	((Acinetobacter or Aspergillus fumigatus or Bacteroides fragilis or Campylobacter or Candida or Clostridi* difficile or Enterobacterales or Enterobacteriaceae or Enterococc* or VRE or Haemophilus influenzae or BLNAR or Helicobacter pylori or Mycobacterium tuberculosis or Mycoplasma genitalium or Neisseria gonorrhoeae or Nontuberculous Mycobacterium or NTM or Pseudomonas aeruginosa or Salmonella or Shigella or Staphylococcus aureus or MRSA or Streptococcus pneumoniae or PNSP or A fumigatus or B fragilis or C difficile or H influenzae or H pylori or M tuberculosis or M genitalium or N gonorrhoeae or P aeruginosa or S aureus or S pneumoniae or Streptococcus pyogenes or Streptococcus agalactiae or Streptococcus Group A or Streptococcus Group B) adj2 (susceptib* or nonsusceptib* or resist*)).ti,ab,tw.	179,974
6	(multi drug resistant acinetobacter or MDR Acinetobacter or multi drug resistant Pseudomonas aeruginosa or MDR Pseudomonas aeruginosa or carbapenem R enterobacterales or carbapenem resistant enterobacterales or cephalosporin* resistant enterobacterales or extended spectrum beta lactamase enterobacterales or drug R neisseria gonorrhoeae or drug resistant neisseria gonorrhoeae or MDR mycobacterium tuberculosis or XDR mycobacterium tuberculosis or multi drug resistant mycobacterium tuberculosis or extensively drug resistant mycobacterium tuberculosis or nontuberculous mycobacterium or clostridioides difficile or vancomycin R Enterococci or vancomycin resistant enterococci or methicillin resistant staphylococcus aureus or MRSA or methicillin R Staphylococcus aureus or vancomycin resistant staphylococcus aureus or vancomycin R staphylococcus aureus or penicillin non susceptible streptococcus pneumoniae or PNSP or drug resistant mycoplasma genitalium or drug R mycoplasma genitalium or candida auris or drug R candida or drug resistant candida or azole resistant aspergillus fumigatus or azole R aspergillus fumigatus or drug resistant helicobacter pylori or drug R helicobacter pylori or multi drug resistant bacteroides fragilis or drug resistant campylobacter or drug R campylobacter or drug resistant salmonella or drug R salmonella or fluorloquinolone resistant shigella or beta lactamase non producing ampicillin resistant haemophilus influenzae or erythromycin resistant group A Streptococcus or erythromycin R group A Streptococcus or Clindamycin resistant group B streptococcus or Clindamycin R group B	101,267

	streptococcus).ti,ab.	
7	or/1-6	962,128
8	Cost/ or exp Health Economics/ or (cost or costs or costly or costing or pharmacoeconomic* or pharmaco-economic*).ti,ab,kw.	3,716,497
9	exp mortality/ or (death or deaths or mortality).ti,ab.	4,625,851
10	exp length of stay/ or (length adj3 stay).ti,ab. or (hospital* adj3 stay).ti,ab. or (ICU adj2 stay).ti,ab. or (intensive care adj2 stay).ti,ab. or (hospital* adj3 admission*).ti,ab.	740,431
11	((productivity adj2 loss) or (absenteeism or presenteeism) or (work adj2 loss) or (work adj2 lost)).ti,ab. or exp presenteeism/ or exp absenteeism/	47,658
12	or/8-11	8,403,750
13	exp Japan/ or Japan*.ti,ab.	750,088
14	7 and 12 and 13	1,678
15	limit 14 to (english or japanese)	1,662
16	(case reports or editorial or note or letter or comment or Books or Chapter or News).pt. or exp case report/ or case report?.ti.	9,854,159
17	15 not 16	1,526
18	remove duplicates from 17	1,222
19	limit 18 to last 10 years	803

2. Search strategy for the Cochrane database
Database(s): EBM Reviews - Cochrane Central Register of Controlled Trials August 2022, EBM Reviews - Cochrane Database of Systematic Reviews 2005 to September 28, 2022, EBM Reviews - Cochrane Clinical Answers September 2022

#	Searches	Results
1	exp antimicrobial drug resistance/	2,386
2	exp antibiotic/ and resist*.ti,ab,kw.	4,275
3	(exp Acinetobacter/ or exp Aspergillus fumigatus/ or exp Bacteroides fragilis/ or exp Campylobacter/ or exp Candida/ or exp Clostridioides difficile/ or exp enterobacteriaceae/ or exp enterobacterales/ or exp enterococcus/ or exp haemophilus influenzae/ or exp helicobacter pylori/ or exp Mycobacterium tuberculosis/ or exp Mycoplasma genitalium/ or exp Neisseria gonorrhoeae/ or exp nontuberculous mycobacteria/ or exp Pseudomonas aeruginosa/ or exp Salmonella/ or exp Shigella/ or exp Staphylococcus aureus/ or exp Streptococcus pneumoniae/ or exp Streptococcus Group A/ or exp Streptococcus Group B/) and (susceptib* or nonsusceptib* or resist*).ti,ab,kw.	1,702

4	((Acinetobacter or Aspergillus fumigatus or Bacteroides fragilis or Campylobacter or Candida or Clostridi* difficile or Enterobacterales or Enterobacteriaceae or Enterococc* or VRE or Haemophilus influenzae or BLNAR or Helicobacter pylori or Mycobacterium tuberculosis or Mycoplasma genitalium or Neisseria gonorrhoeae or Nontuberculous Mycobacterium or NTM or Pseudomonas aeruginosa or Salmonella or Shigella or Staphylococcus aureus or MRSA or Streptococcus pneumoniae or PNSP or A fumigatus or B fragilis or C difficile or H influenzae or H pylori or M tuberculosis or M genitalium or N gonorrhoeae or P aeruginosa or S aureus or S pneumoniae or Streptococcus pyogenes or Streptococcus agalactiae or Streptococcus Group A or Streptococcus Group B) adj2 (susceptib* or nonsusceptib* or resist*)).ti,ab,tw.	2,542
5	(multi drug resistant acinetobacter or MDR Acinetobacter or multi drug resistant Pseudomonas aeruginosa or MDR Pseudomonas aeruginosa or carbapenem R enterobacterales or carbapenem resistant enterobacterales or cephalosporin* resistant enterobacterales or extended spectrum beta lactamase enterobacterales or drug R neisseria gonorrhoeae or drug resistant neisseria gonorrhoeae or MDR mycobacterium tuberculosis or XDR mycobacterium tuberculosis or multi drug resistant mycobacterium tuberculosis or extensively drug resistant mycobacterium tuberculosis or nontuberculous mycobacterium or clostridioides difficile or vancomycin R Enterococci or vancomycin resistant enterococci or methicillin resistant staphylococcus aureus or MRSA or methicillin R Staphylococcus aureus or vancomycin resistant staphylococcus aureus or vancomycin R staphylococcus aureus or penicillin non susceptible streptococcus pneumoniae or PNSP or drug resistant mycoplasma genitalium or drug R mycoplasma genitalium or candida auris or drug R candida or drug resistant candida or azole resistant aspergillus fumigatus or azole R aspergillus fumigatus or drug resistant helicobacter pylori or drug R helicobacter pylori or multi drug resistant bacteroides fragilis or drug resistant campylobacter or drug R campylobacter or drug resistant salmonella or drug R salmonella or fluorloquinolone resistant shigella or beta lactamase non producing ampicillin resistant haemophilus influenzae or erythromycin resistant group A Streptococcus or erythromycin R group A Streptococcus or Clindamycin resistant group B streptococcus or Clindamycin R group B streptococcus).ti,ab.	1,662
6	or/1-5	7,989
7	Cost/ or exp Health Economics/ or (cost or costs or costly or costing or pharmacoeconomic* or pharmaco-economic*).ti,ab,kw.	94,829
8	exp mortality/ or (death or deaths or mortality).ti,ab.	151,182
9	exp length of stay/ or (length adj3 stay).ti,ab. or (hospital* adj3 stay).ti,ab. or (ICU adj2 stay).ti,ab. or (intensive care adj2 stay).ti,ab. or (hospital* adj3 admission*).ti,ab.	48,494
10	((productivity adj2 loss) or (absenteeism or presenteeism) or (work adj2 loss) or (work adj2 lost)).ti,ab. or exp presenteeism/ or exp absenteeism/	2,647
11	or/7-10	259,924
12	exp Japan/ or Japan*.ti,ab.	24,069
13	6 and 11 and 12	16
14	remove duplicates from 13	16

3. Search strategy for ICHUSHI
ICHUSHI 2022 October 18

#	Searches	Results
1	"微生物薬剤耐性"/TH	50,176
2	"抗細菌剤"/TH AND ("耐性"/TA OR "抵抗性"/TA)	17,532
3	"抗感染剤"/TH AND ("耐性"/TA OR "抵抗性"/TA)	26,773
4	("Acinetobacter"/TA OR "アシネトバクター"/TA OR "アシネトバクター属"/TA OR "ヘレラ属"/TA OR "ミマ属"/TA OR "Aspergillus fumigatus"/TA OR "アスペルギルスフミガーツス"/TA OR "アスペルギルス・フミガーツス"/TA OR "Bacteroides fragilis"/TA OR "バクテロイデスフラギリス"/TA OR "バクテロイデス・フラギリス"/TA OR "バクテロイデス・フラジリス"/TA OR "フラギリス菌"/TA OR "Campylobacter"/TA OR "カンピロバクター"/TA OR "カンピロバクター属"/TA OR "Candida"/TA OR "カンジダ"/TA OR "カンジダ属"/TA OR "カンディダ"/TA OR "トルラ酵母"/TA OR "トルロプシス属"/TA OR "モニリア属"/TA OR "Clostridium difficile"/TA OR "クロストリジウムディフシレ"/TA OR "クロストリジウム・ディフィシル"/TA OR "クロストリジウム・ディフィシレ"/TA OR "クロストリディウム・ディフィシル"/TA OR "クロストリディオイデス・ディフィシル"/TA OR "ディフィシル菌"/TA OR "Enterobacteriaceae"/TA OR "エンテロバクテリア科"/TA OR "エンテロバクテリア"/TA OR "エンテロバクテリアセアエ"/TA OR "エンテロバクテリアセエ"/TA OR "腸内細菌科"/TA OR "Enterococcus"/TA OR "エンテロコッカス"/TA OR "腸球菌"/TA OR "エンテロコッカス属"/TA OR "腸球菌属"/TA OR "腸内連鎖球菌"/TA OR "Haemophilus influenzae"/TA OR "インフルエンザ菌"/TA OR "インフルエンザ杆菌"/TA OR "インフルエンザ桿菌"/TA OR "パイフェル菌"/TA OR "ヘモフィルスインフルエンゼ"/TA OR "ヘモフルス・インフルエンゼ"/TA OR "Helicobacter pylori"/TA OR "H.ピロリ"/TA OR "カンピロバクター・ピロリ"/TA OR "ピロリ菌"/TA OR "ヘリコバクターピロリ"/TA OR "ヘリコバクター・ピロリ"/TA OR "ヘリコバクタ・ピロリ"/TA OR "Mycobacterium tuberculosis"/TA OR "結核菌"/TA OR "ヒト型結核菌"/TA OR "マイコバクテリウム・ツベルクローシス"/TA OR "Mycoplasma genitalium"/TA OR "マイコプラズマ・ゲニタリウム"/TA OR "性器マイコプラズマ"/TA OR "Neisseria gonorrhoeae"/TA OR "淋菌"/TA OR "ナイセリアゴノリア"/TA OR "ナイセリア・ゴノリア"/TA OR "ナイセリア・ゴノレエ"/TA OR "Pseudomonas aeruginosa"/TA OR "緑膿菌"/TA OR "シュードモナスアエルギノーザ"/TA OR "シュードモナス・エルジノーサ"/TA OR "Salmonella"/TA OR "サルモネラ"/TA OR "サルモネラ属"/TA OR "Shigella"/TA OR "シゲラ"/TA OR "赤痢菌"/TA OR "シゲラ属"/TA OR "赤痢菌属"/TA OR "Staphylococcus aureus"/TA OR "黄色ブドウ球菌"/TA OR "スタヒロコッカス・アウレウス"/TA OR "スタフィロコッカスアウレウス"/TA OR "メチシリン感受性黄色ブドウ球菌"/TA OR "黄ブ菌"/TA OR "黄色ぶどう球菌"/TA OR "黄色葡萄球菌"/TA OR "黄色葡萄状球菌"/TA OR "Streptococcus pneumoniae"/TA OR "肺炎球菌"/TA OR "肺炎連鎖球菌"/TA OR "ストレプトコッカスニューモニエ"/TA OR "ストレプトコッカス・ニゥモニア"/TA OR "ストレプトコッカス・ニューモニア"/TA OR "肺炎レンサ球菌"/TA OR "肺炎双球菌"/TA OR "Enterobacterales"/TA OR "腸内細菌目"/TA OR "VRE"/TA OR "BLNAR"/TA OR "Nontuberculous Mycobacteria"/TA OR "非定型抗酸菌"/TA OR "非結核性抗酸菌"/TA OR "非定型マイコバクテリア"/TA OR "非定型ミコバクテリア"/TA OR "非定型抗酸性菌"/TA OR "類結核型杆菌"/TA OR "類結核型桿菌"/TA OR "NTM"/TA OR "MRSA"/TA OR "PNSP"/TA OR "Streptococcus pyogenes"/TA OR "A 群連鎖球菌"/TA OR "化膿性連鎖球菌"/TA OR "A 群レンサ球菌"/TA OR "A 群 β 溶連菌"/TA OR "A 群溶血レンサ球菌"/TA OR "A 群溶血性レンサ球菌"/TA OR "A 群溶血性連鎖球菌"/TA OR "A 群溶連菌"/TA OR "ストレプトコッカス A 群"/TA OR "ストレプトコッカス・ピオゲネス"/TA OR "化膿レンサ球菌"/TA OR "化膿性レンサ球菌"/TA OR "化膿連	30,140

	鎖球菌"/TA OR "溶血性 A 群連鎖球菌"/TA OR "溶血性連鎖球菌 A 群"/TA OR "Streptococcus agalactiae"/TA OR "B 群連鎖球菌"/TA OR "B 群レンサ球菌"/TA OR "B 群溶血性連鎖球菌"/TA OR "B 群溶連菌"/TA OR "ストレプトコッカス B 群"/TA OR "ストレプトコッカスアガラクチエ"/TA OR "ストレプトコッカス・アガラクチエ"/TA OR "ストレプトコッカス・アガラクティエ"/TA OR "溶血性 B 群連鎖球菌"/TA OR "溶血性連鎖球菌 B 群"/TA) AND ("感受性"/TA OR "非感受性"/TA OR "耐性"/TA OR "抵抗性"/TA)	
5	"多剤耐性アシネトバクター"/TA OR "多剤耐性緑膿菌"/TA OR "カルバペネム耐性腸内細菌科細菌"/TA OR "CRE"/TA OR "セファロスポリン耐性腸内細菌科細菌"/TA OR "セファロスポリン耐性腸内細菌"/TA OR "ESBL"/TA OR "薬剤耐性淋菌"/TA OR "多剤耐性結核菌"/TA OR "超多剤耐性結核菌"/TA OR "非結核性抗酸菌"/TA OR "NTM"/TA OR "クロストリディオイデス・ディフィシル"/TA OR "バンコマイシン耐性腸球菌"/TA OR "メチシリン耐性黄色ブドウ球菌"/TA OR "バンコマイシン耐性黄色ブドウ球菌"/TA OR "ペニシリン耐性肺炎球菌"/TA OR "薬剤耐性マイコプラズマ・ジェニタリウム"/TA OR "カンジダ・アウリス"/TA OR "薬剤耐性カンジダ"/TA OR "アゾール耐性アスペルギルス・フミガタス"/TA OR "薬剤耐性ヘリコバクター・ピロリ"/TA OR "多剤耐性バクテロイデス・フラジリス "/TA OR "薬剤耐性カンピロバクター"/TA OR "薬剤耐性サルモネラ"/TA OR "キノロン耐性赤痢菌"/TA OR "β ラクタマーゼ非産生アンピシリン耐性インフルエンザ菌"/TA OR "BLNAR"/TA OR "薬剤耐性 A 群連鎖球菌"/TA OR "薬剤耐性 B 群連鎖球菌"/TA	85,094
6	#1 or #2 or #3 or #4 or #5	151,498
7	"医療経済学"/TH OR "医療費"/TH OR "費用効果分析"/TH OR "費用と費用分析"/TH OR "費用便益分析"/TH OR "費用効用分析"/TH OR "費用"/TA OR "コスト"/TA OR "医療経済学"/TA OR "医療費"/TA	54,060
8	"死亡率 "/TH OR "死亡"/TH OR "死亡"/TA	244,748
9	"入院期間"/TH or (("滞在"/TA) and ("日数"/TA or "期間"/TA or "時間"/TA)) or "入院"/TA or "在院"/TA or "病院滞在"/TA or (("ICU"/TA or "集中治療室"/TA or "集中治療"/TA) and ("在室"/TA or "入室"/TA or "滞在"/TA))	233,204
10	"Presenteeism"/TH OR "欠勤"/TH OR "疾病による損失"/TH OR "労働"/TH OR "失業"/TH OR (("効率"/TA OR "生産力"/TA OR "能率"/TA) AND ("損失"/TA OR "低下"/TA)) OR "アブセンティーイズム"/TA OR "アブセンティズム"/TA OR "アブセンティーズム"/TA OR "欠勤率"/TA OR "病欠"/TA OR "Absenteeism"/TA OR "プレゼンティーイズム"/TA OR "プレゼンティズム"/TA OR "プレゼンティーズム"/TA OR "presenteeism"/TA OR ("労働"/TA AND "損失"/TA) OR "失業"/TA	40,428
11	#7 or #8 or #9 or #10	539,192
12	#6 and #11	10,623
13	("症例報告"/TH OR "症例報告"/TI) OR ((PT=症例報告,事例) OR (PT=解説,総説,図説,Q＆A,講義,会議録,座談会,レター,症例検討会,コメント,一般))	11,533,952
14	#12 not #13	4,355
15	(#14) and ((FT=Y) AB=Y PT=原著論文 CK=ヒト)	2,660
16	(#15) and (LA=日本語)	1,222
17	(#16) and (DT=2012:2022)	443

Supplementary Table 2: Quality assessment checklist

First author, Year	**Representativeness of the exposed cohort** a) truly representative (*) b) somewhat representative (*) c) select group of users d) no description of the derivation of the cohort	**Selection of the non-exposed cohort** a) drawn from the same community as the exposed cohort (*) b) drawn from a different source c) no description of the derivation of the non-exposed cohort	**Ascertainment of exposure** a) secure record (e.g., surgical records) (*) b) structured interview (*) c) written self-report d) no description	**Demonstration that outcome of interest was not present at start of study** a) yes (*) b) no	**Comparability of cohorts on the basis of the design or analysis** a) study controls for similar characteristics (*) b) study controls for any additional factor (*)	**Assessment of outcome** a) independent blind assessment (*) b) record linkage (*) c) self-report d) no description	**Was follow-up long enough for outcomes to occur** a) yes (select an adequate follow-up period for outcome of interest) (*) b) no	**Adequacy of follow-up of cohorts** a) complete follow-up - all subjects accounted for (*) b) subjects lost to follow-up unlikely to introduce bias (*)	**Total stars**
Shimizu 2022	*	*	*	*	*			*	6
Imai 2022	*	*	*	*	**	*		*	8
Sakamoto 2021	*	*	*	*	**	*	*	*	9
Tsuzuki 2021	*	*	*	*	*	*		*	7
Kohno 2021	*	*	*	*	*			*	6
Saito 2021	*	*	*	*	**	*	*	*	9
Umemura 2020	*	*	*	*	**	*	*	*	9
Fukuda 2020	*	*	*	*	**			*	7

Mitsuboshi 2020	*	*	*	*	**			*	7
Hayakawa 2020	*	*	*	*	**			*	7
Miyazaki 2020	*	*	*	*	**			*	7
Naylor 2020	*	*	*	*	*	*		*	7
Yuasa 2019	*	*	*	*	*	*		*	7
Hattori 2018	*	*	*	*	*	*		*	7
Uematsu 2018	*	*	*	*	**	*		*	8
Kainuma 2018	*	*	*	*	*			*	6
Shime 2018	*	*	*	*	**			*	7
Uematsu 2017	*	*	*	*	*	*		*	7
Uematsu 2016	*	*	*	*	*	*		*	7
Hamada 2015	*	*	*	*	**	*	*	*	9
Shoji 2015	*	*	*	*	**			*	7
Seki 2015	*	*	*	*	*			*	6
Kaku 2014	*	*	*	*	**			*	7
Aoyagi 2014	*	*	*	*	*	*		*	7
Nagao 2013	*	*	*	*	*			*	6
Shindo 2013	*	*	*	*	*			*	6
Isobe 2012	*	*	*	*	*	*		*	7
Kashimura 2012	*	*	*	*	**	*		*	8
Yamagata 2020	*	*	*	*	*			*	6

Yamada 2019	*	*	*	*	*			*	6
Shoji 2016	*	*	*	*	*			*	6
Hanada 2016	*	*		*	*			*	5
Mizokami 2013	*	*	*	*	**			*	7
Tetsuka 2019	*	*	*	*	*	*	*	*	8
Asai 2018	*	*	*	*	*	*	*	*	8
Fukushima 2022	*	*	*	*	**	*	*	*	9
Ueda 2022	*	*	*	*	**	*	*	*	9
Fukatsu 2021	*	*	*	*	**	*		*	8
Osumi 2021	*	*	*	*	**	*	*	*	9
Kawamura 2017	*		*	*		*	*	*	7
Sasaki 2015	*		*	*	**	*	*	*	8
Obara 2015	*	*	*	*	**	*	*	*	9
Suzuki 2015	*	*	*	*	**	*		*	8
Maeda 2014	*	*	*	*	**	*		*	8
Kosuge 2013	*	*	*	*	**	*	*	*	9
Goto 2014	*	*	*	*	**	*	*	*	9
Natatsuka 2013	*	*	*	*	**	*		*	8
Matsuda 2013	*		*	*	**	*		*	7
Hanaoka 2013	*	*	*	*	**	*	*	*	9
Iwabuchi 2013	*		*	*	**	*		*	7

Sano 2012	*		*	*	**	*		*	7
Ogasawara 2012	*	*	*	*	**	*		*	8
Furukawa 2012	*	*	*	*	**	*		*	8
Suehiro 2012	*		*	*	*	*		*	6
Uryu 2012	*	*	*	*	**	*		*	8
Kobayashi 2013	*	*			*				3

Supplementary Table 3: Study overview

Data base	First author, year [Reference]	Journal	Title
Embase/Ovid	Shimizu 2022 [1]	PLoS ONE. 17(7 July) (no pagination), 2022. Article Number: e0271115. Date of Publication: July 2022.	Relationship between mortality and molecular epidemiology of methicillin-resistant *Staphylococcus aureus bacteremia*
	Imai 2022 [2]	BMC Infectious Diseases. 22(1) (no pagination), 2022. Article Number: 581. Date of Publication: December 2022.	Economic and clinical burden from carbapenem-resistant bacterial infections and factors contributing: a retrospective study using electronic medical records in Japan
	Sakamoto 2021 [3]	BMC Pulmonary Medicine. 21(1) (no pagination), 2021. Article Number: 345. Date of Publication: December 2021.	In-hospital mortality associated with community-acquired pneumonia due to methicillin-resistant *Staphylococcus aureus*: a matched-pair cohort study
	Tsuzuki 2021 [4]	Public Health. 198 (pp 292-296), 2021. Date of Publication: September 2021.	Length of stay, hospitalisation costs and in-hospital mortality of methicillin-susceptible and methicillin-resistant *Staphylococcus aureus* bacteremia in Japan
	Kohno 2021 [5]	Scientific reports. 11(1) (pp 11300), 2021. Date of Publication: 28 May 2021.	A Japanese traditional medicine Hochuekkito promotes negative conversion of vancomycin-resistant *Enterococci*
	Saito 2021 [6]	Antimicrobial Agents and Chemotherapy. 65(3) (no pagination), 2021. Article Number: e01483-20. Date of Publication: March 2021.	A Matched Case-Case-Control Study of the Impact of Clinical Outcomes and Risk Factors of Patients with IMP-Type Carbapenemase-Producing Carbapenem-Resistant *Enterobacteriaceae* in Japan
	Umemura 2021 [7]	International Journal of Infectious Diseases. 103 (pp 343-351), 2021. Date of Publication: February 2021.	Current spectrum of causative pathogens in sepsis: A prospective nationwide cohort study in Japan
	Fukuda 2020 [8]	Scientific reports. 10(1) (pp 17059), 2020. Date of Publication: 13 Oct 2020.	Healthcare resources attributable to methicillin-resistant *Staphylococcus aureus* orthopedic surgical site infections
	Mitsuboshi 2020 [9]	Japanese Journal of Infectious Diseases. 73(4) (pp 288-292), 2020. Date of Publication: 2020.	Advanced age is not a risk factor for mortality in patients with bacteremia caused by extended-spectrum β-lactamase-producing organisms: A multicenter cohort study
	Hayakawa 2020 [10]	Journal of Antimicrobial Chemotherapy. 75(3) (pp 697-708), 2020. Date of Publication: 01 Mar 2020.	Comparison between IMP carbapenemase-producing *Enterobacteriaceae* and non-carbapenemase-producing *Enterobacteriaceae*: a multi-centre prospective study of the clinical and molecular epidemiology of carbapenem-resistant *Enterobacteriaceae*

Data base	First author, year [Reference]	Journal	Title
	Miyazaki 2020 [11]	Journal of Infection and Chemotherapy. 26(2) (pp 242-251), 2020. Date of Publication: February 2020.	Daily practice and prognostic factors for pneumonia caused by methicillin-resistant *Staphylococcus aureus* in Japan: A multicenter prospective observational cohort study
	Naylor 2020 [12]	Frontiers in public health. 8 (pp 562427), 2020. Date of Publication: 2020.	Code-Sharing in Cost-of-Illness Calculations: An Application to Antibiotic-Resistant Bloodstream Infections
	Tetsuka 2019 [13]	Antimicrobial resistance and infection control. 8 (pp 126), 2019. Date of Publication: 2019.	Molecular epidemiological analysis and risk factors for acquisition of carbapenemase-producing *Enterobacter cloacae* complex in a Japanese university hospital
	Yuasa 2019 [14]	SAGE Open Medicine. 7 (no pagination), 2019. Date of Publication: 01 Aug 2019.	Treatment procedures and associated medical costs of methicillin-resistant *Staphylococcus aureus* infection in Japan: A retrospective analysis using a database of Japanese employment-based health insurance
	Hattori 2018 [15]	American Journal of Infection Control. 46(12) (pp e75-e79), 2018. Date of Publication: December 2018.	Epidemiology and risk factors for mortality in blood stream infections: A single-center retrospective study in Japan
	Uematsu 2018 [16]	American Journal of Infection Control. 46(10) (pp 1142-1147), 2018. Date of Publication: October 2018.	Effect of methicillin-resistant *Staphylococcus aureus* in Japan
	Kainuma 2018 [17]	Journal of Infection and Chemotherapy. 24(8) (pp 615-622), 2018. Date of Publication: August 2018.	An outbreak of fluoroquinolone-resistant *Pseudomonas aeruginosa* ST357 harboring the exoU gene
	Asai 2018 [18]	Journal of Infection and Chemotherapy. 24(7) (pp 505-509), 2018. Date of Publication: July 2018.	The epidemiology and risk factor of carbapenem-resistant *Enterobacteriaceae* colonization and infections: Case control study in a single institute in Japan
	Shime 2018 [19]	Infection and Drug Resistance. 11 (pp 1073-1081), 2018. Date of Publication: 2018.	Clinical outcomes after initial treatment of methicillin-resistant *Staphylococcus aureus* infections
	Uematsu 2017 [20]	PLoS ONE. 12(6) (no pagination), 2017. Article Number: e0179767. Date of Publication: June 2017.	Estimating the disease burden of methicillin resistant *Staphylococcus aureus* in Japan: Retrospective database study of Japanese hospitals
	Uematsu 2016 [21]	American Journal of Infection Control. 44(12) (pp 1628-1633), 2016. Date of Publication: 01 Dec 2016.	The economic burden of methicillin-resistant *Staphylococcus aureus* in community-onset pneumonia inpatients

Data base	First author, year [Reference]	Journal	Title
	Hamada 2015 [22]	Journal of Infection and Chemotherapy. 21(7) (pp 527-530), 2015. Date of Publication: 05 Dec 2015.	Clinical features of enterococcal bacteremia due to ampicillin-susceptible and ampicillin-resistant *enterococci*: An eight-year retrospective comparison study
	Shoji 2015 [23]	International Journal of Antimicrobial Agents. 46(5) (pp 532-537), 2015. Date of Publication: 14 Jan 2015.	More accurate measurement of vancomycin minimum inhibitory concentration indicates poor outcomes in methicillin-resistant *Staphylococcus aureus* bacteraemia
	Seki 2015 [24]	Infection and Drug Resistance. 8 (pp 113-118), 2015. Date of Publication: 14 May 2015.	Polymerase chain reaction-based active surveillance of MRSA in emergency department patients
	Kaku 2014 [25]	Journal of Infection and Chemotherapy. 20(6) (pp 350-355), 2014. Date of Publication: June 2014.	Influence of antimicrobial regimen on decreased in-hospital mortality of patients with MRSA bacteremia
	Aoyagi 2014 [26]	Clinical Microbiology and Infection. 20(9) (pp 912-919), 2014. Date of Publication: 01 Sep 2014.	Impact of psm-mec in the mobile genetic element on the clinical characteristics and outcome of SCCmec-II methicillin-resistant *Staphylococcus aureus* bacteraemia in Japan
	Nagao 2013 [27]	Clinical Microbiology and Infection. 19(9) (pp 852-858), 2013. Date of Publication: September 2013.	A multicentre analysis of epidemiology of the nosocomial bloodstream infections in Japanese university hospitals
	Shindo 2013 [28]	American Journal of Respiratory and Critical Care Medicine. 188(8) (pp 985-995), 2013. Date of Publication: 15 Oct 2013.	Risk Factors for Drug-Resistant Pathogens in Community-acquired and Healthcare-associated Pneumonia
	Isobe 2012 [29]	Journal of Infection and Chemotherapy. 18(6) (pp 841-847), 2012. Date of Publication: December 2012.	Methicillin-resistant *Staphylococcus aureus* bacteremia at a university hospital in Japan
	Kashimura 2012 [30]	Surgery Today. 42(7) (pp 639-645), 2012. Date of Publication: July 2012.	Impact of surgical site infection after colorectal surgery on hospital stay and medical expenditure in Japan
	Yamagata 2020 [31]	Journal of Infection & Chemotherapy. 26(6):563-569, 2020 Jun.	Prognostic factors in nursing and healthcare-associated pneumonia
	Yamada 2019 [32]	Journal of Infection & Chemotherapy. 25(12):1001-1006, 2019 Dec.	The intervention by an antimicrobial stewardship team can improve clinical and microbiological outcomes of resistant gram-negative bacteria

Data base	First author, year [Reference]	Journal	Title
	Shoji 2016 [33]	Journal of Orthopaedic Science. 21(3):282-6, 2016 May.	Clinical features, outcomes, and survival factor in patients with vertebral osteomyelitis infected by methicillin-resistant *staphylococci*
	Hanada 2016 [34]	PLoS ONE [Electronic Resource]. 11(1):e0147877, 2016.	Host Factors and Biomarkers Associated with Poor Outcomes in Adults with Invasive Pneumococcal Disease
	Mizokami 2013 [35]	Clinical Interventions In Aging. 8:1015-21, 2013.	Pharmacodynamics of vancomycin in elderly patients aged 75 years or older with methicillin-resistant *Staphylococcus aureus* hospital-acquired pneumonia
ICHUSHI	Fukushima 2022 [36]	Journal of Japanese Society of Hospital Pharmacists	"自動多項目同時遺伝子関連検査システム（Verigene システム）を利用した MRSA 菌血症に対する AST 活動の効果 Effects of AST Activity on MRSA Bacteremia Using the Automatic Simultaneous Multi-Item Genetic Testing System (Verigene System)"
	Ueda 2022 [37]	Journal of Japanese Society of Hospital Pharmacists	"基質特異性拡張型 β-ラクタマーゼ産生大腸菌に起因する尿路感染症に対するセフメタゾールの投与回数の違いによる有効性の比較検討 Comparative study of the effects of different dosing frequencies of Cefmetazole on urinary tract infection caused by extended-spectrum β-Lactamase-Producing Escherichia Coli"
	Fukatsu 2021 [38]	Japanese Journal of Pharmaceutical Health Care and Sciences	"薬剤師によるクラリスロマイシン耐性 *Helicobacter pylori* 感染に対する抗菌薬適正使用支援が初回除菌率と薬剤費に与える影響 Positive impacts of antimicrobial stewardship on initial eradication success and drug costs of treatment for Clarithromycin-resistant *Helicobacter pylori* infections"
	Osumi 2021 [39]	Journal of Japanese Society of Hospital Pharmacists	"ESBL 産生菌が原因と推定される尿路感染症にスペクトラムが外れた経験的治療を開始したことが及ぼす影響の後方視的検討 Retrospective study of initiation of empirical therapies out of the antibacterial spectrum for urinary tract infections presumed to be caused by extended spectrum β-Lactamases producing bacteria"
	Kobayashi 2013 [40]	Japanese Journal of Infection Prevention and Control	"報告 2011 年度の Methicillin-resistant *Staphylococcus aureus* 病院感染症サーベイランス Report Methicillin-resistant *Staphylococcus aureus* Hospital Infectious Disease Surveillance 2011"

Data base	First author, year [Reference]	Journal	Title
	Matsuda 2013 [41]	Medical Journal of Kinki Central Hospital	"日本集中治療医学会第 1 回 Sepsis Registry 調査 2007 年の重症敗血症および敗血症性ショックの診療結果報告 Japan First Sepsis Registry Survey of the Society of Intensive Care Medicine, Report on the Results of Severe Sepsis and Septic Shock in 2007"
	Ogasawara 2012 [42]	Japanese Journal of Infection Prevention and Control	"Meropenem 投与患者における緑膿菌耐性化因子の検討 Factors causing *P. Aeruginosa* resistance in patients treated with Meropenem"
	Furukawa 2012 [43]	Japanese Journal of Infection Prevention and Control	"消化器外科におけるメチシリン耐性黄色ブドウ球菌検出の動向 Trend of methicillin - resistant *Staphylococcus aureus* isolation in gastroenterological surgery"
	Kawamura 2017 [44]	Journal of the Showa University Society	"7 施設におけるメチシリン耐性黄色ブドウ球菌サーベイランス（2015 年度） Surveillance of Methicillin-resistant *Staphylococcus aureus* in 7 Japanese Hospitals, 2015"
	Sasaki 2015 [45]	Medical Journal of Kinki Central Hospital	"近畿中央病院における MRSA 臨床分離株の疫学調査 Epidemiological characterization of clinically isolated MRSA in Kinki Central Hospital, mainly for vancomycin MIC "
	Obara 2015 [46]	Journal of Japanese Society of Hospital Pharmacists	"ペニシリン耐性肺炎球菌感染による追加的医療資源：JANIS 全入院患者部門データを用いた推定 Increased Burden on Medical Resources of Penicillin-Resistant *Streptococcus Pneumoniae* Infections: Estimates Using JANIS Data"
	Suzuki 2015 [47]	Journal of Infection and Chemotherapy	"当院における MRSA 感染制御活動の経済的評価に関する検討 Cost effectiveness of controlling healthcare-associated spread of Methicillin-Resistant *Staphylococcus aureus*"
	Maeda 2014 [48]	Japanese Journal of Infection Prevention and Control	"カルバペネム系薬投与患者における耐性菌選択リスク因子の検討 A study of risk factors for antibiotic selective pressure in carbapenem-treated patients"
	Kosuge 2013 [49]	Journal of the Japanese Society of Intensive Care Medicine	"脳卒中患者における多剤耐性菌感染症の臨床検討

Data base	First author, year [Reference]	Journal	Title
			Clinical characteristics of multidrug-resistant bacteria infection with stroke"
	Goto 2014 [50]	Japanese Journal of Intensive Care Medicine	"バンコマイシン耐性腸球菌の保菌におけるリスク因子の検討 Study of risk factors for carriage of Vancomycin- resistant *Enterococcus*"
	Natatsuka 2013 [51]	The Japanese Society for Dialysis Therapy	"医療・介護関連ガイドラインに従った耐性菌カバーと治療アウトカムとの関連についての検討 An analysis of the correlation between guidelines-concordant treatment and the treatment outcome on nursing and healthcare-associated pneumonia patients"
	Hanaoka 2013 [52]	Journal of the Medical Society of Toho University	"当医療センターでの重症熱傷患者における多剤耐性緑膿菌感染症に対しての抗菌薬療法 Antimicrobial Therapy for Multi-drug Resistant *Pseudomonas aeruginosa* (MDRP) Infection in Patients with Severe Burns, Admitted to Chiba Emergency Medical Center"
	Iwabuchi 2013 [53]	Japanese Journal of Infection Prevention and Control	"敗血症の実態と対策 Actual situation of sepsis and countermeasures"
	Sano 2012 [54]	Journal of the Medical Society of Toho University	"呼吸器内科における MRSA 感染症の現状 Current status of MRSA infection in respiratory medicine"
	Suehiro 2012 [55]	Japanese journal of clinical and experimental medicine	"緊急入院患者における MRSA および ESBL 産生菌の検出状況について Detection Status of MRSA and ESBL-Producing Bacteria in Emergency Hospitalized Patients"
	Uryu 2012 [56]	Journal of Japanese Society for Clinical Pathway	"当院における DPC 導入前後の肺炎球菌性肺炎診療報酬の推移 Changes in medical treatment fees for pneumococcal pneumonia in our hospital before and after the introduction of DPC"

Supplementary Table 4: PRISMA check list

Section and topic	Item #	Checklist item	Location where item is reported (Page #)
Title			
Title	1	Identify the report as a systematic review.	1
Abstract			
Abstract	2	See the PRISMA 2020 for Abstracts checklist (table 2).	3
Introduction			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	6
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	6
Methods			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	7
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	8
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	3-8 Supplementary material
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	8
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	8
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	7
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	7
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	9
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	8,9

Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	7
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	9
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	9
	13d	Describe any methods used to synthesise results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	9
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	9
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesised results.	10
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	10
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	9
Results			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram (see fig 1).	11
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	None
Study characteristics	17	Cite each included study and present its characteristics.	11, 14, supplementary table 3, 5, 6
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	9, supplementary table 2
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	15-19, supplementary table 5, 6-11
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	9, 11, 14
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	17-19, supplementary figure 1-12
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	17-19, supplementary figure 2-4, 6-

			10, 12
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesised results.	17, supplementary figure 2-4, 6-10, 12
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	17-18, supplementary figure 1, 5, 11
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	17-19
Discussion			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	20-21
	23b	Discuss any limitations of the evidence included in the review.	22
	23c	Discuss any limitations of the review processes used.	None
	23d	Discuss implications of the results for practice, policy, and future research.	22
Other information			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	Not registered
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Prepared but not published
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	None
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	23
Competing interests	26	Declare any competing interests of review authors.	23
Availability of data, code, and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	24

Supplementary Table 5: Study characteristics

First author, year [Reference]	Study design	Study setting	Overall sample size	Sample size (Resistant population)	Study population
Shimizu 2022 [1]	Cohort study	Single center	41	41	MRSA bacteremia
Imai 2022 [2]	Cohort study	Multicenter	9,517	86	Carbapenem-resistant and susceptible patients with pneumonia, UTI, biliary infection, or sepsis with the administration of the intravenous antibiotics
Sakamoto 2021 [3]	Cohort study	Multicenter	15,422	3,102	MRSA pneumonia
Tsuzuki 2021 [4]	Cohort study	Single center	147	63	Patients with MRSA and MSSA bacteremia
Kohno 2021 [5]	Cohort study	Single center	122	122	VRE infections
Saito 2021 [6]	Cohort study	Single center	384	96	IMP-CRE infection
Umemura 2021 [7]	Cohort study	Multicenter	125	40	MRSA and MSSA patients with acute respiratory distress syndrome, severe sepsis, or septic shock
Fukuda 2020 [8]	Cohort study	Multicenter	2,001,511	4,365	MRSA patients with SSI in orthopedic surgery
Mitsuboshi 2020 [9]	Cohort study	Multicenter	179	179	BSI caused by ESBL
Hayakawa 2020 [10]	Cohort study	Multicenter	88	88	CRE infection
Miyazaki 2020 [11]	Cohort study	Multicenter	199	199	MRSA pneumonia
Naylor 2020 [12]	Cohort study	Multicenter	1,219,136	4,017	BSI
Tetsuka 2019 [13]	Case-control study	Single center	39	39	CRE infection
Yuasa 2019 [14]	Cohort study	Multicenter	365	365	MRSA infection
Hattori 2018 [15]	Cohort study	Single center	2,105	345	BSI
Uematsu 2018 [16]	Cohort study	Multicenter	14,905	7,188	MRSA infection
Kainuma 2018 [17]	Cohort study	Single center	41	41	Fluoroquinolone-resistant *Pseudomonas aeruginosa* infections
Asai 2018 [18]	Case-control study	Single center	78	26	Patients with carbapenem-susceptible and carbapenem-resistant *Enterobacteriaceae* infection
Shime 2018 [19]	Cohort study	Multicenter	245	245	MRSA infection

First author, year [Reference]	Study design	Study setting	Overall sample size	Sample size (Resistant population)	Study population
Uematsu 2017 [20]	Cohort study	Multicenter	7,772,050	93,838	Surgical and non-surgical subjects with MRSA infection
Uematsu 2016 [21]	Cohort study	Multicenter	88,061	634	MRSA patients with community-onset pneumonia
Hamada 2015 [22]	Cohort study	Single center	143	58	Patients with ampicillin-susceptible and resistant enterococcal bacteremia
Shoji 2015 [23]	Cohort study	Single center	140	140	MRSA bacteremia
Seki 2015 [24]	Cohort study	Single center	95	15	MRSA infection
Kaku 2014 [25]	Cohort study	Single center	83	83	MRSA bacteremia
Aoyagi 2014 [26]	Cohort study	Single center	51	51	MRSA bacteremia
Nagao 2013 [27]	Cohort study	Multicenter	2,941	498	Nosocomial BSI
Shindo 2013 [28]	Cohort study	Multicenter	1,413	119	Pneumonia
Isobe 2012 [29]	Cohort study	Single center	115	115	MRSA bacteremia
Kashimura 2012 [30]	Cohort study	Multicenter	334	12	Colorectal surgery diagnosed with SSI
Yamagata 2020 [31]	Cohort study	Single center	817	817	Nursing and healthcare-associated pneumonia (NHCAP)
Yamada 2019 [32]	Cohort study	Single center	1,187	217	BSI who administered long-term use of broad-spectrum antibiotics
Shoji 2016 [33]	Cohort study	Multicenter	71	16	MRSA vertebral osteomyelitis infection
Hanada 2016 [34]	Cohort study	Multicenter	506	127	Invasive pneumococcal disease
Mizokami 2013 [35]	Cohort study	Single center	94	94	MRSA hospital-acquired pneumonia who had been treated with vancomycin
Fukushima 2022 [36]	Cohort study	Single center	67	67	Patient with MRSA bacteremia
Ueda 2022 [37]	Cohort study	Single center	46	46	Patients with urinary tract infection caused by ESBL production Escherichia coli
Fukatsu 2021 [38]	Cohort study	Single center	184	184	Patients with Clarithromycin-resistant *Helicobacter pylori* infections

First author, year [Reference]	Study design	Study setting	Overall sample size	Sample size (Resistant population)	Study population
Osumi 2021 [39]	Cohort study	Single center	50	25	Patients who have been hospitalized for UTI and detected ESBL
Kobayashi 2013 [40]	Cross-sectional	NR	NR	NR	MRSA infection
Matsuda 2013 [41]	Cohort study	NR	266	41	Sepsis patients
Ogasawara 2012 [42]	Cohort study	Single center	33	20	Patients with *Pseudomonas aeruginosa* infection and treated with meropenem
Furukawa 2012 [43]	Cohort study	Single center	5,047	258	Patient detection of MRSA within 3 months after digestive surgery
Kawamura 2017 [44]	Cohort study	Multicenter	1,583,493 patient days	Number of MRSA infections and carriers: 413 Number of MRSA BSI: 63	MRSA bloodstream infections
Sasaki 2015 [45]	Cohort study	Single center	95	95	Inpatient MRSA patients
Obara 2015 [46]	Cohort study	Single center	41,184	61	PRSP patients
Suzuki 2015 [47]	Cohort study	Single center	2006: 191,182 patients and days/year 2006: 187,881 patients and days/years 2006: 184,482 patients and days/year 2006: 181,358 patients, day/year	2006: 191,182 patients and days/year 2006: 187,881 patients and days/years 2006: 184,482 patients and days/year 2006: 181,358 patients and day/year	Patients with MRSA
Maeda 2014 [48]	Cohort study	Single center	381	151	Carbapenem-resistant / non-resistant patients
Kosuge 2013 [49]	Cohort study	Single center	118	14	MDR bacterial infection

First author, year [Reference]	Study design	Study setting	Overall sample size	Sample size (Resistant population)	Study population
Goto 2014 [50]	Cohort study	Single center	474	43	VRE positive, VRE negative infection
Natatsuka 2013 [51]	Cohort study	Single center	181	181	Patients with pneumonia
Hanaoka 2013 [52]	Cohort study	Single center	113	32	With or without MDRP infection
Iwabuchi 2013 [53]	Cohort study	Single center	288	40	Methicillin-resistant staphylococcal sepsis
Sano 2012 [54]	Cohort study	Single center	169	169	Patients with MRSA infection
Suehiro 2012 [55]	Cohort study	Single center	46	46	MRSA patients, ESBL patients
Uryu 2012 [56]	Cohort study	Single center	349	349	Pneumonia patients

Abbreviations: BSI, Bloodstream infection; CPE, Carbapenemase-producing *Enterobacteriaceae*; CRE, Carbapenem-resistant *Enterobacteriaceae*; ESBL, Extended-spectrum beta-lactamases; IMP-CRE, Imipenem-Carbapenem-resistant *Enterobacteriaceae*; MDR, Multi-drug resistant; MDRP, Multi-drug resistant *Pseudomonas aeruginosa*, MRSA, Methicillin-resistant *Staphylococcus aureus*; MSSA, Methicillin-susceptible *Staphylococcus aureus*; NHCAP, Nursing and healthcare-associated pneumonia; PRSP, Penicillin-resistant *Streptococcus Pneumoniae*; SSI, Surgical site infection; UTI, Urinary tract infection; VRE, Vancomycin-resistant *Enterococci*.

Supplementary Table 6: Baseline characteristics of included studies

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
Shimizu 2022 [1]	MRSA bacteremia	41	60 (28–70)	59	NR	NR	2 (1–4)	NR	Healthcare-associated infection: 66	Intravascular device: 49 Wound: 17 Urinary tract: 10 Lung: 10 Skin/Soft tissue: 7 Abdominal: 5 Meningitis: 3
Imai 2022 [2]	Carbapenem-susceptible infections	9,431	76.4 (12.5) *	56.6	21.2 (4.2) % <18.5: 26.7 18.5–25: 57.3 ≥25: 16.0	NR	% 0 point: 11.0 ≥1 point: 89.0	Myocardial infarction: 4.2 Cerebrovascular disease: 29.5 Congestive heart failure: 18.8 Rheumatic disease: 2.9 Dementia: 14.3 Diabetes without complications: 20.9 Diabetes with complications: 4.0 Mild liver disease: 6.0 Moderate or severe liver disease: 1.3 Peptic ulcer disease: 10.1	NR	Pneumonia: 48.1 Sepsis: 16.5 UTI: 34.5 Biliary infection: 13.9

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
								Peripheral vascular disease: 4.9 Chronic pulmonary disease: 7.1 Paraplegia and hemiplegia: 2.5 Renal disease: 7.9 Cancer: 37.3 Metastatic carcinoma: 10.9 HIV: 0.1		
	Carbapenem-resistant infections	86	74.9 (12.7) *	68.6	20.8 (4.5) % <18.5: 32.6 18.5–25: 52.3 ≥25: 15.1	NR	% 0 point: 15.1 ≥1 point: 84.9	Myocardial infarction: 2.3 Cerebrovascular disease: 30.2 Congestive heart failure: 19.8 Rheumatic disease: 7.0 Dementia: 8.1 Diabetes without complications: 29.1 Diabetes with complications: 7.0 Mild liver disease: 5.8 Moderate or severe liver disease: 2.3 Peptic ulcer disease:	NR	Pneumonia: 53.5 Sepsis: 16.3 UTI: 27.9 Biliary infection: 16.3

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
								4.7 Peripheral vascular disease: 3.5 Chronic pulmonary disease: 7.0 Paraplegia and hemiplegia: 1.2 Renal disease: 4.7 Cancer: 31.4 Metastatic carcinoma: 7.0 HIV: 0.0		
Sakamoto 2021 [3]	MRSA pneumonia	3,102	79.6 (10.7) *	66.4	% <18.5: 44.7 18.5–24.9: 36.6 25–29.9: 3.7 ≥30: 0.9 Missing: 14	Hugh-Jones grade % I: 4.3 II: 6.2 III: 7.5 IV: 14.0 V: 30.6 Missing: 37.5 A-DROP score % 0: 5.2	NR	Diabetes: 18.4 COPD: 10.6 Respiratory failure: 52 Aspiration pneumonia: 7.4 *Pseudomonas aeruginosa* pneumonia: 2.2 Interstitial lung disease: 2.8 Orientation disturbance: 30.3 Chronic heart failure: 20.9 Chronic liver diseases: 0.23	Community-acquired: 100	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
						1: 20.6 2: 28.0 3: 22.6 4: 13.2 5: 7.0 Missing: 3.3		Sepsis: 4.61 Acute renal failure: 0.64 Leukopenia: 0.32 Immunosuppression: 0.10 Stroke: 13.5		
	Non-MRSA pneumonia	12,320	79.5 (10.5) *	66.4	% <18.5: 28.7 18.5–24.9: 47.9 25–29.9: 9.3 ≥30: 1.6 Missing: 12.5	Hugh-Jones grade % I: 13.0 II: 14.4 III: 11.5 IV: 19.8 V: 19.3 Missing: 22.0 A-DROP score % 0: 8.8 1: 31.5 2: 31.4 3: 17.0	NR	Diabetes: 18.4 COPD: 12.6 Respiratory failure: 37.3 Aspiration pneumonia: 1.7 *Pseudomonas aeruginosa* pneumonia: 2.3 Interstitial lung disease: 3.3 Orientation disturbance: 15.7 Chronic heart failure: 19.1 Chronic liver diseases: 0.17 Sepsis: 1.24 Acute renal failure: 0.44	Community-acquired: 100	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
						4: 6.4 5: 2.6 Missing: 2.2		Leukopenia: 0.28 Immunosuppression: 0.14 Stroke: 9.98		
Tsuzuki 2021 [4]	MSSA bacteremia	84	72 (50–82)	52.4	NR	NR	NR	NR	NR	NR
	MRSA bacteremia	63	76 (64–89)	55.6	NR	NR	NR	NR	NR	NR
Kohno 2021 [5]	Vancomycin-resistant *Enterococci* infection: Deceased	26	69.9 (17.5)*	57.7	22.9 (4.02)	NR	NR	Diabetes mellitus: 26.9 Hypertension: 34.6 Dyslipidemia: 3.8 Cardiovascular disease: 26.9 Malignant tumor: 11.5	NR	NR
	Vancomycin-resistant *Enterococci* infection: Survived	96	72.6 (12.2)*	60.4	22.1 (4.47)	NR	NR	Diabetes mellitus: 32.3 Hypertension: 42.7 Dyslipidemia: 12.5 Cardiovascular disease: 16.7 Malignant tumor: 29.2	NR	NR
Saito 2021 [6]	Control group	192	68 (53–76) (0–99^)	59.9	NR	NR	2 (1–4)	Dependent functional status: 30.7 Myocardial infarction: 5.7	NR	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
								Congestive heart failure: 7.3 Peripheral vascular disease: 7.8 Cerebrovascular accident: 20.8 Dementia: 6.8 COPD: 4.2 Connective tissue disease: 14.6 Peptic ulcer disease: 4.7 Diabetes mellitus: 16.7 Liver disease: 9.4 Renal disease: 8.3 Hemiplegia: 8.9 Leukemia: 2.1 Lymphoma: 1.6 Localized solid tumor: 27.6 Metastatic solid tumor: 14.1 HIV: 3.1		
	Carbapenem-resistant infections group	96	76 (66.3–84) (3–96^)	54.2	NR	NR	2 (1–3.8)	Dependent functional status: 53.1 Myocardial infarction: 6.3	NR	Infections: 32.3 Urinary tract: 10.4 Pneumonia: 8.3 Catheter-related

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
								Congestive heart failure: 17.7 Peripheral vascular disease: 4.2 Cerebrovascular accident: 21.9 Dementia: 9.4 COPD: 9.4 Connective tissue disease: 18.8 Peptic ulcer disease: 1.0 Diabetes mellitus: 22.9 Liver disease: 3.1 Renal disease: 14.6 Hemiplegia: 4.2 Leukemia: 2.1 Lymphoma: 0 Localized solid tumor: 29.2 Metastatic solid tumor: 6.3 HIV: 1.0		bloodstream infection: 5.2 Skin and soft tissue: 2.1 Intra-abdominal: 2.1 Other: 4.2
	Carbapenem-susceptible infections group	96	74 (66–84) (10–95^)	59.4	NR	NR	2 (1–3.8)	Dependent functional status: 56.3 Myocardial infarction: 7.3	NR	Infections: 35.4 Urinary tract: 6.3 Pneumonia: 9.4 Catheter-related

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
								Congestive heart failure: 17.7 Peripheral vascular disease: 6.3 Cerebrovascular accident: 12.5 Dementia: 8.3 COPD: 9.4 Connective tissue disease: 12.5 Peptic ulcer disease: 0 Diabetes mellitus: 18.8 Liver disease: 5.2 Renal disease: 6.3 Hemiplegia: 5.2 Leukemia: 1 Lymphoma: 4.2 Localized solid tumor: 21.9 Metastatic solid tumor: 11.5 HIV: 0		bloodstream infection: 7.3 Skin and soft tissue: 2.1 Intra-abdominal: 4.2 Other: 6.3
Umemura 2021 [7]	Methicillin-sensitive *Staphylococcus aureus* infections	85	68 (56–76)	49.4	22 (18.3–25)	NR	1 (0–3)	Diabetes mellitus: 30.6 Chronic kidney disease: 4.7	NR	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
								Chronic heart failure: 4.7 Chronic respiratory failure: 11.8 Cerebrovascular disease: 15.3 Cancer: 11.8		
	Methicillin-resistant *Staphylococcus aureus* infections	40	74 (67–83)	72.5	21.6 (19–25.4)	NR	2 (1–4)	Diabetes mellitus: 35 Chronic kidney disease: 15 Chronic heart failure: 5 Chronic respiratory failure: 25 Cerebrovascular disease: 12.5 Cancer: 17.5	NR	NR
Fukuda 2020 [8]	Non-surgical site infection: Amputation	15,769	NR	60.3	NR	NR	NR	Diabetes (recorded diagnosis): 9.1 Rheumatic disease: 23.8	NR	NR
	MRSA surgical site infection: Amputation	1,152	NR	69.0	NR	NR	NR	Diabetes (recorded diagnosis): 2.9 Rheumatic disease: 37.9	NR	NR
	Non-surgical site infection: Spinal fusion	369,655	NR	58.5	NR	NR	NR	Diabetes (recorded diagnosis): 8.1 Rheumatic disease: 1.3	NR	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
	MRSA surgical site infection: Spinal fusion	1,279	NR	68.5	NR	NR	NR	Diabetes (recorded diagnosis): 7 Rheumatic disease: 5.7	NR	NR
	Non-surgical site infection: Open reduction of fracture	855,358	NR	29.5	NR	NR	NR	Diabetes (recorded diagnosis): 5.1 Rheumatic disease: 1.1	NR	NR
	MRSA surgical site infection: Open reduction of fracture	1,046	NR	49.8	NR	NR	NR	Diabetes (recorded diagnosis): 5.9 Rheumatic disease: 5.1	NR	NR
	Non-surgical site infection: Hip prosthesis	371,527	NR	18.4	NR	NR	NR	Diabetes (recorded diagnosis): 5.2 Rheumatic disease: 1.4	NR	NR
	MRSA surgical site infection: Hip prosthesis	567	NR	40.6	NR	NR	NR	Diabetes (recorded diagnosis): 8.8 Rheumatic disease: 8.5	NR	NR
	Non-surgical site infection: Knee	230,249	NR	19.3	NR	NR	NR	Diabetes (recorded diagnosis): 8.4 Rheumatic disease: 0.5	NR	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
	prosthesis									
	MRSA surgical site infection: Knee prosthesis	257	NR	30.4	NR	NR	NR	Diabetes (recorded diagnosis): 8.6 Rheumatic disease: NR	NR	NR
	Non-surgical site infection: Laminectomy	154, 588	NR	65.5	NR	NR	NR	Diabetes (recorded diagnosis): 6.3 Rheumatic disease: 0.4	NR	NR
	MRSA surgical site infection: Laminectomy	64	NR	79.7	NR	NR	NR	Diabetes (recorded diagnosis): NR Rheumatic disease: NR	NR	NR
Mitsubishi 2020 [9]	ESBL-producing bacteremia: PSM non-matching: Age 65-84 years	110	75 (65–84^)	62.0	NR	qSOFA-score%: 32	NR	Cardiovascular disease: 15 Pulmonary disease: 12 Renal disease: 20 Liver disease: 17 Neurological disease: 37 Diabetes mellitus: 27 Solid cancer: 29 Hematologic malignancy: 12	Hospital-acquired infection: 46	Urinary track: 51 Biliary track: 18 Others: 31
	ESBL-	69	89 (85–	48.0	NR	qSOFA	NR	Cardiovascular	Hospital-	Urinary track: 62

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
	producing bacteremia: PSM non-matching: Age ≥85 years		100^)			-score%: 36		disease: 25 Pulmonary disease: 12 Renal disease: 16 Liver disease: 3 Neurological disease: 54 Diabetes mellitus: 17 Solid cancer: 23 Hematologic malignancy: 3	acquired infection: 28	Biliary track: 26 Others: 12
Hayakawa 2020 [10]	CPE infections	25	77 (69–82)	56	NR	Pitt bacteremia score: 2 (0–3^) qSOFA: 2 (1–2)	3 (2–5)	Dependent functional status: 76 Congestive heart failure: 12 Cerebrovascular accident: 28 Dementia: 16 Chronic pulmonary disease: 0 Connective tissue disease: 8 Diabetes mellitus (uncomplicated): 28 Liver disease (mild): 12 Renal diseases (moderate to severe): 0	NR	Urinary tract infection: 8 Pneumonia: 12 Intra-abdominal: 16 Skin and soft tissue infection (including surgical site infection): 4

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
								Leukemia or lymphoma: 8 Localized solid tumor: 32 Metastatic solid tumor: 16		
	Non-CPE infections	63	70 (61–79)	61.9	NR	Pitt bacteremia score: 2 (0–4^) qSOFA: 1 (1–2)	2 (1–3)	Dependent functional status: 38.1 Congestive heart failure: 12.7 Cerebrovascular accident: 17.5 Dementia: 6.3 Chronic pulmonary disease: 11.1 Connective tissue disease: 7.9 Diabetes mellitus (uncomplicated): 7.9 Liver disease (mild): 0 Renal diseases (moderate to severe): 11.1 Leukemia or lymphoma: 4.8 Localized solid tumor: 23.8 Metastatic solid	NR	Urinary tract infection: 11.1 Pneumonia: 7.9 Intra-abdominal: 6.3 Skin and soft tissue infection (including surgical site infection): 7.9

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
								tumor: 6.3		
Miyazaki 2020 [11]	MRSA pneumonia: HAP	76	76 (67.5–82)	80.3	NR	IROAD % Mild: 52.6 Moderate: 21.1 Severe: 26.3 PORT % I: NR II: NR III: NR IV: NR V: NR Unknown: NR	NR	Underlying diseases: 94.7 Malignancy: 28.9 Hepatic disease: 6.6 Congestive heart failure: 21.1 Cerebrovascular disease: 15.8 Renal disease: 18.4 Respiratory disease: 32.9	Hospital-acquired pneumonia: 100	NR
	MRSA pneumonia: NHCAP	95	79 (71–84)	82.1	NR	IROAD Mild: 32.6 Moderate: 28.4 Severe: 38.9 PORT I: NR II: NR	NR	Underlying diseases: 97.9 Malignancy: 37.9 Hepatic disease: 5.3 Congestive heart failure: 13.7 Cerebrovascular disease: 21.1 Renal disease: 20.0 Respiratory disease:	Nursing and healthcare-associated pneumonia: 100	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
						III: NR IV: NR V: NR Unknown: NR		37.9		
	MRSA pneumonia: CAP	25	77 (63–82)	76	NR	IROAD % Mild: NR Moderate: NR Severe: NR PORT % I: 0.0 II: 8.0 III: 12.0 IV: 32.0 V: 44.0 Unknown: 4.0	NR	Underlying diseases: 96.0 Malignancy: 8.0 Hepatic disease: 4.0 Congestive heart failure: 28.0 Cerebrovascular disease: 12.0 Renal disease: 20.0 Respiratory disease: 60.0	Community-acquired pneumonia: 100	NR
Naylor 2020 [12]	Non-*Staphylococcus aureus* BSI	1,215,119	70 (58–79)	52.6	NR	NR	NR	NR	NR	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
	Staphylococcus aureus BSI	4,017	77 (66–85)	60.5	NR	NR	NR	NR	NR	NR
Tetsuka 2019 [13]	Carbapenemase producing *Enterobacter cloacae* complex infection	20	65 (0–82^)	60.0	NR	NR	NR	Underlying conditions: 100 History of surgery: 85 Any malignancy: 30 Chronic renal insufficiency: 20 Neurological disorder: 25 Congestive heart failure: 15 Diabetes: 15 Transplant recipient: 15 Cirrhosis: 5 Decubitus or pressure ulcer: 0 Chronic lung disease: 5 Liver failure: 5 Urinary tract problems or abnormalities: 0 Myocardial infarction: 5 HIV positive: 0	NR	Pneumonia: 25 Peritonitis: 5 Pyelonephritis: 0 Bacteremia: 5 Cholangitis: 5 Vascular graft infection: 0 Abscess: 5

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
	Non-Carbapenemase producing *Enterobacter cloacae* complex infection	19	71 (0–89^)	63.2	NR	NR	NR	Underlying conditions: 89 History of surgery: 63 Any malignancy: 47 Chronic renal insufficiency: 21 Neurological disorder: 16 Congestive heart failure: 21 Diabetes: 16 Transplant recipient: 5 Cirrhosis: 5 Decubitus or pressure ulcer: 5 Chronic lung disease: 0 Liver failure: 0 Urinary tract problems or abnormalities: 5 Myocardial infarction: 0 HIV positive: 5	NR	Pneumonia: 10.5 Peritonitis: 26.3 Pyelonephritis: 15.8 Bacteremia: 10.5 Cholangitis: 0 Vascular graft infection: 5.3 Abscess: 0
Yuasa 2019 [14]	MRSA infection: Bacteremia	120	48.5 (15.5)*	66.7	NR	NR	NR	Diabetes mellitus: 56.7 Cancer: 55.8	NR	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
								Cerebrovascular disease: 14.2 Bone fracture/bone disorder: 10.0 Rheumatoid arthritis: 2.5		
	MRSA infection: Pneumonia	88	61 (13.8) *	63.6	NR	NR	NR	Diabetes mellitus: 56.8 Cancer: 52.3 Cerebrovascular disease: 28.4 Bone fracture/bone disorder: 12.5 Rheumatoid arthritis: 5.7	NR	NR
	MRSA infection: Surgical site infection	23	49.7 (15) *	73.9	NR	NR	NR	Diabetes mellitus: 43.5 Cancer: 26.1 Cerebrovascular disease: 17.4 Bone fracture/bone disorder: 21.7 Rheumatoid arthritis: 4.3	NR	NR
	MRSA infection: Others	32	48.6 (16.3) *	65.6	NR	NR	NR	Diabetes mellitus: 37.5 Cancer: 40.6 Cerebrovascular disease: 12.5	NR	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
								Bone fracture/bone disorder: 15.6 Rheumatoid arthritis: 6.3		
	MRSA infection: Unknown	102	53 (14.9) *	74.5	NR	NR	NR	Diabetes mellitus: 44.1 Cancer: 37.3 Cerebrovascular disease: 21.6 Bone fracture/bone disorder: 21.6 Rheumatoid arthritis: 3.9	NR	NR
Hattori 2018 [15]	Bloodstream infections	2,105	NR	57.4	NR	SOFA: 4.8 (3.8) * qSOFA (≥2)%: 38.1	3.9 (3.1) *	Myocardial infarction: 4.9 Congestive heart failure: 25.4 Peripheral vascular disease: 9.7 Cerebrovascular disease: 13.5 Dementia: 16.2 Chronic pulmonary disease: 8 Rheumatologic disease: 7.1 Peptic ulcer disease: 12.7 Liver disease: 15.5	Hospital-acquired infection: 45.4 Community-acquired infection: 54.6	Urinary tract infection: 23.4 Catheter-related bloodstream infection: 16.8

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
								Hemiplegia or paraplegia: 8.5 Diabetes: 31 Renal disease: 13.5 Leukemia or lymphoma: 8 Solid tumor: 34.7 AIDS: 0		
Uematsu 2018 [16]	MRSA infections	7,188	69.4 (25.9) *	63.2	NR	NR	1.1 (1.3) *	NR	Nosocomial infection: 11.8	Bloodstream infection: 8.7
	MSSA infections	7,717	65.4 (27.2) *	57.9	NR	NR	0.99 (1.2) *	NR	Nosocomial infection: 6.2	Bloodstream infection: 12.2
Kainuma 2018 [17]	Fluoroquinolone-resistant *Pseudomonas aeruginosa*: exoS─exoU+	36	NR (25–89^) 64.6 (NR) *	81	NR	NR	NR	NR	NR	NR
	Fluoroquinolone-resistant *Pseudomonas aeruginosa*: exoS+exoU─	5	NR (13–76^) 55.2 (NR) *	80	NR	NR	NR	NR	NR	NR
	Fluoroquinolone-resistant *Pseudomonas aeruginosa*	41	NR (13–89^) 63.4 (17.4) *	80.5	NR	NR	NR	Cancer: 39.0 Brain diseases: 14.6 Circulatory diseases: 12.2	NR	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
								Renal diseases: 9.8 Leukemia: 9.8 Collagen diseases: 7.3 Burn, respiratory failure: 7.3		
Asai 2018 [18]	Carbapenem-resistant *Enterobacteriaceae* infection	26	77 (16–99^)	54	NR	NR	3.6 (1.8) * CCI ≥3%: 69	Diabetes mellitus: 15 Heat failure: 15 Kidney disease: 42 Malignancy: 38 Cerebrovascular disease: 42 Hemiplegia: 19 Collagen vascular disease/Autoimmune disease: 15 Dementia: 12	NR	NR
	Carbapenem-sensitive *Enterobacteriaceae* infection	52	76.5 (16–98^)	54	NR	NR	2 (2.1) * CCI ≥3%: 35	Diabetes mellitus: 8 Heat failure: 13 Kidney disease: 15 Malignancy: 21 Cerebrovascular disease: 17 Hemiplegia: 8 Collagen vascular disease/Autoimmune disease: 6 Dementia: 10	NR	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
Shime 2018 [19]	All patients: MRSA infection	245	71 (61–79)	71.8	NR	SOFA score Day 0: 2 (0–6) Days 2–3: 2 (0–5)[!] Days 5–7: 2 (0–4)[!] APACHE II: 12 (8–20)	3 (1–4)	Diabetes mellitus: 36.7 End-stage renal disease: 17.6 Cancer: 27.3 Liver disease: 9.4	NR	Bacteremia: 28.2 Lung: 42.9 Skin and soft tissue: 29.8 Bone and joint: 8.6 Others: 13.5
	Vancomycin: MRSA infections	174	71 (60–78)	69.5	NR	SOFA score Day 0: 2 (0–6) Day 2–3: 2 (0–5)[!] Day 5–7: 1 (0–4)[!] APACHE II: 11 (8–19)	3 (1-5)	Diabetes mellitus: 43.1 End-stage renal disease: 19.5 Cancer: 23.0 Liver disease: 9.2	NR	Bacteremia: 32.2 Lung: 41.4 Skin and soft tissue: 28.7 Bone and joint: 8.0 Others: 16.1
	Linezolid: MRSA infections	38	74 (65–79)	68.4	NR	SOFA score Day 0: 4 (2–7)	2 (1–4)	Diabetes mellitus: 15.8 End-stage renal disease: 13.2	NR	Bacteremia: 15 Lung: 76.3 Skin and soft

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
						Day 2–3: 3 (1–6)! Day 5–7: 3 (0–5)! APACHE II: 15 (9–23)		Cancer: 42.1 Liver disease: 10.5		tissue: 13.2 Bone and joint: 5.3 Others: 13.2
	Daptomycin: MRSA infections	11	70 (65–74)	100	NR	SOFA score Day 0: 2 (1–7) Day 2–3: 1 (0–6)! Day 5–7: 1 (0–2)! APACHE II: 11 (7–12)	2 (0–3)	Diabetes mellitus: 27.3 End-stage renal disease: 9.1 Cancer: 36.4 Liver disease: 18.2	NR	Bacteremia: 18.2 Lung: 9.1 Skin and soft tissue: 63.6 Bone and joint: 18.2 Others: 9.1
	Teicoplanin: MRSA infections	22	65 (53–82)	81.8	NR	SOFA score Day 0: 0 (0–3) Day 2–3: 0 (0–4)! Day 5–	2 (0–3)	Diabetes mellitus: 27.3 End-stage renal disease: 13.6 Cancer: 27.3 Liver disease: 0	NR	Bacteremia: 22.7 Lung: 13.6 Skin and soft tissue: 50.0 Bone and joint: 13.6 Others: 18.2

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
						7: 0 (0–3)! APACHE II: 12 (8–16)				
Uematsu 2017 [20]	Anti-MRSA drug group	93,838	66.8 (21) *	62.1	NR	NR	NR	NR	NR	NR
	Control group	2,181,827	62.6 (25.1) *	53.6	NR	NR	NR	NR	NR	NR
	Non-infection group	5,496,385	59.3 (24) *	52.4	NR	NR	NR	NR	NR	NR
Uematsu 2016 [21]	Anti-MRSA drug group	634	76.6 (13.1) *	64.2	NR	A-DROP score % Mild: 10.3 Moderate: 48.7 Severe: 19.2 Extremely severe: 21.8	% 0: 26.7 1: 27.9 ≥2: 45.4	NR	Community-onset pneumonia: 100	NR
	Control group	87,427	75.6 (14.9) *	59.1	NR	A-DROP score	% 0: 30.6	NR	Community-onset pneumonia: 100	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
						% Mild: 16.7 Moderate: 61.1 Severe: 13.5 Extremely severe: 8.8	1: 33.5 ≥2: 35.9			
Hamada 2015 [22]	Ampicillin susceptible bacteremia	85	72 (NR) NR (14.9) *	65.9	NR	NR	NR	Chronic kidney disease: 31.8 Solid cancer: 38.8 Hematological cancer: 10.6 Diabetes mellitus: 18.8 Chronic heart failure: 20.0 Neutropenia: 9.4 Solid organ transplant recipient: 0 Bone marrow transplant recipient: 1.2 Cirrhosis: 7.1 Immunosuppressive therapy: 14.1	Community-acquired: 27.1 Hospital-acquired: 72.9	Abdomen: 29.4 Urinary: 18.8 Surgical site: 11.8 CRBSI: 3.5 Endocarditis: 4.7 Mucositis associated with febrile neutropenia: 5.9 Others: 3.5 Un-determined: 22.4

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
	Ampicillin-resistant bacteremia	58	71 (NR) NR (14.4) *	63.8	NR	NR	NR	Chronic kidney disease: 34.5 Solid cancer: 36.2 Hematological cancer: 34.5 Diabetes mellitus: 20.7 Chronic heart failure: 24.1 Neutropenia: 36.2 Solid organ transplant recipient: 0 Bone marrow transplant recipient: 6.9 Cirrhosis: 10.3 Immunosuppressive therapy: 39.7	Community-acquired: 12.1 Hospital-acquired: 87.9	Abdomen: 36.2 Urinary: 10.3 Surgical site: 3.4 CRBSI: 1.7 Endocarditis: 0 Mucositis associated with febrile neutropenia: 29.3 Others: 5.2 Un-determined: 13.8
Shoji 2015 [23]	MRSA bacteremia survivors	99	71 (52–81)	61	NR	NR	7 (5–9)	Malignancy: 26.3 Diabetes mellitus: 28.3 Renal failure (hemodialysis): 22.2	NR	Skin, soft tissue and bone: 15.2 Central nervous system: 3 Lower respiratory tract: 9.1 Intra-abdominal: 11.1 Infectious endocarditis: 7.1 Kidney and urinary

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
										tract: 7.1 Catheter or other medical device-related: 47.5 Unknown origin: 17.2
	MRSA bacteremia non-survivors	41	73 (58–85)	66	NR	NR	9 (6–10)	Malignancy: 22.0 Diabetes mellitus: 31.7 Renal failure (hemodialysis): 29.3	NR	Skin, soft tissue and bone: 12.2 Central nervous system: 0 Lower respiratory tract: 14.6 Intra-abdominal: 17.1 Infectious endocarditis: 0 Kidney and urinary tract: 2.4 Catheter or other medical device-related: 58.5 Unknown origin: 9.8
Seki 2015 [24]	MRSA infection-positive patients: PCR+Culture+	9	56.4 (24.9) *	77.8	NR	SOFA score: 5.3 (4.1) * APACHE II score:	NR	Trauma: 44.4 Cerebrovascular diseases: 33.3 Infectious diseases: 11.1 Post-resuscitation:	NR	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
						20.8 (9.1) *		11.1 Burn: 0		
	MRSA infection-positive patients: PCR+Culture-	3	18.9 (7.5) *	100	NR	SOFA score: 6.7 (0.5) * APACHE II score: 20.0 (1.4) *	NR	Trauma: 0 Cerebrovascular diseases: 100 Infectious diseases: 0 Post-resuscitation: 0 Burn: 0	NR	NR
	MRSA infection-positive patients: PCR-Culture+	3	43.7 (14.4) *	33.3	NR	SOFA score: 4.7 (1.7) * APACHE II score: 22.0 (2.1) *	NR	Trauma: 0 Cerebrovascular diseases: 33.3 Infectious diseases: 33.3 Post-resuscitation: 0 Burn: 33.3	NR	NR
Kaku 2014 [25]	MRSA bacteremia	83	67.3 (17) *	69.9	NR	SOFA-score: 5.8 (4.7) * SOFA-score≥5 %: 51.8	NR	Malignancy: 41.0 Hematologic malignancy: 7.2 Chemotherapy within 30 days: 9.6 Cardiovascular disease: 39.8 Diabetes mellitus: 28.9 Chronic renal failure: 24.1	Community-acquired: 3.6 Healthcare-associated: 6.0 Hospital-acquired: 90.4	Intravascular device: 30.1 Respiratory tract (patients with pneumonia): 20.5 Soft tissue: 8.4 Surgical wound: 7.2 Abdominal cavity: 4.8 Bone: 2.4

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
								Hemodialysis: 20.5 CNS disease: 21.7 Respiratory disease: 15.7 Hepatobiliary disease: 15.7 Autoimmune/allergic disease: 14.5 Immunosuppressive drugs or corticosteroids use: 12.0 Physical trauma: 10.8 Gastrointestinal disease: 8.4 Transplantation: 6.0		Others: 6.0 Unknown: 20.5
Aoyagi 2014 [26]	Mutant MRSA bacteremia	10	71 (63.3–77.3)	73	NR	NR	2.6 (2.17) *	Cardiovascular disease: 40 Malignancy (solid cancer): 20 CNS disease: 10 Chronic renal failure: 20 Diabetes mellitus: 30 Autoimmune disease: 20 Corticosteroid use: 20 Digestive disease: 0	Community-associated infection: 0 Healthcare-associated community onset: 40 Hospital onset: 60	Catheter-related bloodstream infection (CRBSI): 30 CRBSI + multiple sites: 10 Skin and soft tissue infection: 10 Surgical wound infection: 0 Pneumonia: 20 Infectious endocarditis (IE): 0

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
								Chronic respiratory disease: 10 Chronic liver disease: 0		Vascular infection other than IE: 10 Intra-abdominal infection: 10 Bone and joint: 10 UTI: 10 Sepsis (origin unknown): 0
	Wild-type MRSA bacteremia	41	72 (61–77)	63	NR	NR	2.31 (1.88) *	Cardiovascular disease: 32 Malignancy (solid cancer): 20 CNS disease: 22 Chronic renal failure: 17 Diabetes mellitus: 15 Autoimmune disease: 12 Corticosteroid use: 12 Digestive disease: 15 Chronic respiratory disease: 7 Chronic liver disease: 7	Community-associated infection: 0 Healthcare-associated community onset: 10 Hospital onset: 90	Catheter-related bloodstream infection (CRBSI): 73 CRBSI + multiple sites: 10 Skin and soft tissue infection: 7 Surgical wound infection: 5 Pneumonia: 0 Infectious endocarditis (IE): 2 Vascular infection other than IE: 0 Intra-abdominal infection: 2 Bone and joint: 2 UTI: 0 Sepsis (origin unknown): 7

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
Nagao 2013 [27]	Nosocomial bloodstream infections	2,941	NR (0–92^) 61.3 (NR) *	60.1	NR	NR	NR	Solid tumor: 39.6 Hematological malignancy: 11.8 Diabetes mellitus: 14.8 Liver dysfunction: 6.2 Chronic kidney disease: 5.1 Neutropenia: 13.5 Collagen disease: 3.4	Nosocomial infection: 100	Catheter-related bloodstream infection: 22.6 Urinary tract infection: 14.8 Pneumonia/empyema: 6 Surgical site infection: 6.2 Skin and soft tissue infection: 1.4 Intra-abdominal infection: 14.5 Febrile neutropenia: 8.7 Focus unknown: 21
Shindo 2013 [28]	Community-acquired pneumonia	887	75 (66–83)	65.4	NR	PSI class % I–III: 42.4 IV: 37.9 V: 19.8	NR	Neoplastic diseases: 12.5 Chronic lung diseases: 34.8 Congestive heart failure: 11.0 Chronic renal diseases: 7.2 Chronic liver diseases: 3.9 CNS disorders: 15.7 Diabetes: 18.0 Immunosuppression:	Community-acquired pneumonia: 100	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
								6.5		
	Healthcare-associated pneumonia	526	79 (70–85)	63.7	NR	PSI class % I–III: 16.5 IV: 42.6 V: 40.8	NR	Neoplastic diseases: 18.4 Chronic lung diseases: 30.6 Congestive heart failure: 16.2 Chronic renal diseases: 9.3 Chronic liver diseases: 3.4 CNS disorders: 31.4 Diabetes: 18.6 Immunosuppression: 7.6	Healthcare-associated pneumonia: 100	NR
Isobe 2012 [29]	Methicillin-resistant *Staphylococcus aureus* bacteremia: survivors	69	60.5 (18.5) *	69.6	20.8 (3.7)	NR	NR	Sepsis: 37.7 Septic shock: 2.9 Respiratory failure: 20.3 DIC: 11.6	NR	Catheter: 31.3 Lung: 5.8 Urinary tract: 1.7 Surgical site: 17.4 Tumors: 8.7 Mix: 1.4 Others: 23.2 Unknown: 10.1
	Methicillin-resistant *Staphylococcus aureus* bacteremia:	46	64.4 (19.2) *	58.7	21.4 (4.5)	NR	NR	Sepsis: 65.2 Septic shock: 13.6 Respiratory failure: 58.7	NR	Catheter: 10.9 Lung: 13 Urinary tract: 2.2 Surgical site: 10.3

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
	non-survivors							DIC: 34.8		Tumors: 6.5 Mix: 6.5 Others: 15.2 Unknown: 34.8
Kashimura 2012 [30]	Surgical site infection	167	66.2 (NR) *	61.7	NR	NR	NR	NR	NR	NR
	Non-surgical site infection	167	66.2 (NR) *	61.7	NR	NR	NR	NR	NR	NR
Yamagata 2020 [31]	Overall (Nursing and healthcare-associated pneumonia)	817	78 (11.1) *	71	NR	A-DROP score %: 0: 5.3 1: 21.9 2: 34.5 3: 27.1 4: 10.0 5: 1.2	NR	Chronic heart disease: 35.9 Cerebrovascular disease: 29.1 Malignancy: 25.6 COPD: 25.5 Dementia: 20.3 Diabetes mellitus: 20.0 Chronic kidney disease: 10.5 Chronic liver disease: 4.9	Nursing and healthcare-associated pneumonia: 100	NR
Yamada 2019 [32]	Pre-antimicrobial stewardship programs group (BSI)	492	NR	61.4	NR	NR	NR	NR	NR	NR
	Post-antimicrobia	695	NR	60.9	NR	NR	NR	NR	NR	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
	l stewardship programs group (BSI)									
Shoji 2016 [33]	Methicillin-susceptive *staphylococci* osteomyelitis infection	55	NR (18–88^^) 64.4 (NR) *	77.1	NR	NR	NR	Diabetes mellitus: 18.2 End stage renal disease hemodialysis: 1.8 Liver disease: 3.6 Malignancy: 5.5 Use steroid: 5.5 Rheumatic disease: 7.3	Hospital-onset infection: 27.3	Skin and subcutaneous infection: 5.5 Urinary tract infection: 9.1 Pulmonary infection: 5.5 Infected central venous access: 1.8 Others: 1.8 Unknown: 72.7
	Methicillin-resistant *staphylococci* osteomyelitis infection	16	NR (57–82^^) 70.6 (NR) *	68.8	NR	NR	NR	Diabetes mellitus: 62.5 End stage renal disease hemodialysis: 12.5 Liver disease: 6.3 Malignancy: 6.3 Use steroid: 18.8 Rheumatic disease: 18.8	Hospital-onset infection: 37.5	Skin and subcutaneous infection: 6.3 Urinary tract infection: 12.5 Pulmonary infection: 0 Infected central venous access: 12.5 Others: 12.5 Unknown: 56.3
Hanada 2016 [34]	Overall (Invasive pneumococc	506	NR	62.3	NR	% ~ Bactere	NR	Any underlying diseases: 90.5	NR	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
	al disease)					mia without sepsis: 20.5 Sepsis: 33.0 Severe sepsis: 35.0 Septic shock: 11.5		Malignancy: 23.5 Diabetes mellitus: 18.2 Cardiovascular disease: 18.2 Immunosuppression: 12.7 Liver disease: 9.9 Lung disease: 7.5 Renal disease:7.5		
Mizokami 2013 [35]	MRSA pneumonia Survivors	62	NR (75–99^) 83 (6.2) *	63	NR	Japanese Respiratory Society guidelines: % Mild: 14.5 Moderate: 40.3 Severe: 45.2	NR (0–8^) 2.4 (1.8) *	NR	Hospital-acquired pneumonia: 100	NR
	MRSA pneumonia non-survivors	32	NR (75–93^) 81.8 (5.2) *	75	NR	Japanese Respiratory Society guideli	NR (1–10^) 3.1 (2.5) *	NR	Hospital-acquired pneumonia: 100	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
						nes: % Mild: 12.5 Moderate: 9.4 Severe: 78.1				
Fukushima 2022 [36]	MRSA: Before AST group	16	79.5 (50–93^)	68.8	NR	NR	NR	NR	NR	NR
	MRSA: After AST group	51	77 (53–92^)	68.6	NR	NR	NR	NR	NR	NR
Ueda 2022 [37]	ESBL: Cefmetazole-2-time group	23	84 (76–87^)	17.4	NR	qSOFA: 1ᵑ (0–2^)	NR	Diabetes: 21.7 Immunodeficiency: 0 Malignant tumor: 13	Community-acquired: 78.3	NR
	ESBL: Cefmetazole-3-time group	23	79 (71.5–83.5^)	34.8	NR	qSOFA: 1ᵑ (0–1^)	NR	Diabetes: 13 Immunodeficiency: 4.3 Malignant tumor: 13	Community-acquired: 69.6	NR
Fukatsu 2021 [38]	Clarithromycin-resistant: Non-ASP group	145	66 (19–87^)	52.4	NR	NR	NR	Gastritis: 71.0 Stomach ulcer: 20.0 Duodenal ulcer: 6.9 Other: 2.1	NR	NR
	Clarithromycin-resistant: ASP group	39	64 (21–83^)	48.7	NR	NR	NR	Gastritis: 82.1 Stomach ulcer: 12.8 Duodenal ulcer: 2.6 Other: 2.6	NR	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
Osumi 2021 [39]	ESBL: After the trend score match-Sensitive group	25	80 (60–99^)	36.0	NR	qSOFA % 0: 32.0 1: 52.0 2: 16.0 3: 0	NR	Diabetes: 28.0 Cancer: 20.0 Hemodialysis: 0	NR	NR
	ESBL: After the trend score match-Resistant group	25	85 (50–95^)	40.0	NR	qSOFA % 0: 32.0 1: 56.0 2: 12.0 3: 0	NR	Diabetes: 16.0 Cancer: 28.0 Hemodialysis: 0	NR	NR
Kawamura 2017 [44]	MRSA patients	1,583,493	NR	NR	NR	NR	NR	NR	NR	NR
Sasaki 2015 [45]	Patients with MRSA	95	77 (24–100^) 75.3 (NR) *	55.8	NR	NR	NR	Diabetes: 28.4 Hypertension: 41.1 Malignant neoplasm: 40.0 Central venous catheter: 26.3	NR	NR
Obara 2015 [46]	PRSP infection	61	NR	NR	NR	NR	% 44.3	NR	NR	NR
	PRSP is not infectious	41,123	NR	NR	NR	NR	% 40.9	NR	NR	NR
Suzuki 2015 [47]	MRSA patients: In 2006	191,182 #	NR	NR	NR	NR	NR	NR	NR	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
	MRSA patients: In 2007	187,881 #	NR	NR	NR	NR	NR	NR	NR	NR
	MRSA patients: In 2008	184,482 #	NR	NR	NR	NR	NR	NR	NR	NR
	MRSA patients: In 2009	186,226 #	NR	NR	NR	NR	NR	NR	NR	NR
Maeda 2014 [48]	Without drug-resistant organisms	230	68 (16.1)	67.4	NR	NR	NR	Malignancy: 40.4 Diabetes mellitus: 36.1 Hemodialysis (renal failure): 6.1	NR	NR
	With drug-resistant organisms	151	73.6 (13.4)	73.5	NR	NR	NR	Malignancy: 33.8 Diabetes mellitus: 44.4 Hemodialysis (renal failure): 21.2	NR	NR
Kosuge 2013 [49]	MDR bacteria	14	79.5 (5.9)	50.0	NR	GCS % 13<: 28.6 (Mild) 10–12: 14.3 9>: 57.1	NR	Diabetes: 14.3	NR	NR
	Bacteria other than	27	78.9 (10.5)	33.3	NR	GCS % 13<:	NR	Diabetes: 11.1	NR	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
	MDR					29.6 (Mild) 10–12: 22.2 9>: 48.1				
Goto 2014 [50]	VRE positive	43	NR	53.5	NR	NR	NR	Diabetes: 16.3 Malignant tumor: 60.5 Cardiovascular disease: 55.8 Digestive system disease: 74.4	NR	NR
	VRE negative	431	NR	58.2	NR	NR	NR	Diabetes: 21.3 Malignant tumor: 32.3 cardiovascular disease: 68.2 Digestive system disease: 52.2	NR	NR
Natatsuka 2013 [51]	MRSA patients (Under)	61	78.3 (13.8) *	65.6	NR	A-DROP severity class % Mild: 3.3 Moderate: 54.1 Severe:	NR	Central nervous system disorder: 47.5 Chronic lung disease: 42.6 Congestive heart failure: 16.4 Diabetes mellitus: 13.1 Neoplastic disease:	NR	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
						41.0		9.8 Immunosuppression: 14.8 Dementia: 42.6		
	MRSA patients (Proper)	127	81.5 (9.8) *	65.4	NR	A-DROP severity class % Mild: 0.8 Moderate: 46.5 Severe: 52.0	NR	Central nervous system disorder: 48.8 Chronic lung disease: 22.8 Congestive heart failure: 16.5 Diabetes mellitus: 18.9 Neoplastic disease: 12.6 Immunosuppression: 6.3 Dementia: 44.9	NR	NR
	MRSA patients (Over)	38	78.8 (9.5) *	65.8	NR	A-DROP severity class % Mild: 2.6 Moderate: 26.3 Severe: 71.1	NR	Central nervous system disorder: 52.6 Chronic lung disease: 26.3 Congestive heart failure: 15.8 Diabetes mellitus: 28.9 Neoplastic disease: 26.3 Immunosuppression: 18.4	NR	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
								Dementia: 52.6		
	MRSA All patients	226	NR	NR	NR	NR	NR	NR	NR	NR
Kobayashi 2013 [40]	All patients	NR	NR	NR	NR	NR	NR	NR	NR	NR
Matsuda 2013 [41]	All patients	266	67.1 (14.7) *	63.9	NR	APACHE II: 20.3 (9.9) * SOFA: 8.5 (4.7) *	NR	DIC: 47.4	NR	NR
Hanaoka 2013 [52]	MDRP infection (previous period)	15	48.3 (12.5) *	53.3	NR	NR	NR	NR	NR	NR
	No MDRP infection (Previous period)	71	57 (18.4) *	63.4	NR	NR	NR	NR	NR	NR
	MDRP infection (latter period)	17	58.1 (27.8) *	82.4	NR	NR	NR	NR	NR	NR
Iwabuchi 2013 [53]	Sepsis cases	91	73.6 (11.7) *	54.9	NR	NR	NR	Diabetes: 65.9 Cardiovascular disorders: 23 Cerebrovascular accident: 39.5 Catheter placement:	NR	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
								61.5		
	Septic death	57	75 (11.6) *	56.1	NR	NR	NR	Diabetes: 63.1 Catheter placement: 66.6	NR	NR
	Methicillin-resistant staphylococcal sepsis	40	NR	NR	NR	NR	NR	NR	NR	NR
Sano 2012 [54]	Patients with MRSA	169	73 (NR) *	76.9	NR	NR	NR	Malignant tumors: 38.5 COPD: 32 Old pulmonary tuberculosis: 20.1 Cerebrovascular disease: 16.0	NR	NR
Ogasawara 2012 [42]	Resistance to Meropenem	20	68.4 (8) *	75	NR	NR	NR	NR	NR	NR
	Non-resistance to Meropenem	13	75.8 (5.7) *	100	NR	NR	NR	NR	NR	NR
Furukawa 2012 [43]	NR	258	67.6 (NR) *	74.4	NR	NR	NR	NR	NR	NR
Suehiro 2012 [55]	Patients with MRSA or ESBL	46	86.1 (8.7)	41.3	NR	NR	NR	NR	NR	NR
	Patients with MRSA	36	85.9 (9.4)	44.4	NR	NR	NR	NR	NR	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
	ESBL-producing bacteria	10	86.6 (6.3)	30.0	NR	NR	NR	NR	NR	NR
Uryu 2012 [56]	Group A: itemized-payment period [2004/10~2006/05]	124	73.5 (20–94)	69.4	NR	A-DROP: 2 (1–4^)	NR	62.9	NR	NR
	Group B: pre-revision period [2006/06~2008/03]	112	74 (20–99)	63.4	NR	A-DROP: 2 (1–4^)	NR	58.0	NR	NR
	Group C: post-revision period [2008/04~2010/03]	113	78 (22–97)	69.0	NR	A-DROP: 2 (1–4^)	NR	51.3	NR	NR
	Penicillin-resistant *Streptococcus pneumoniae*: Group A	6	71.5 (58–85)	NR	NR	A-DROP: 2 (1–4^)	NR	NR	NR	NR
	Penicillin-resistant *Streptococcus pneumoniae*: Group B	2	62.5 (43–82)	NR	NR	A-DROP: 1.5 (1–2^)	NR	NR	NR	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
	Penicillin-resistant *Streptococcus Pneumoniae*: Group C	11	82 (62–89)	NR	NR	A-DROP: 2 (1–3^)	NR	NR	NR	NR
	Penicillin-intermediate *Streptococcus Pneumoniae*: Group A	53	78 (22–94)	NR	NR	A-DROP: 2 (1–4^)	NR	NR	NR	NR
	Penicillin-intermediate *Streptococcus Pneumoniae*: Group B	40	77 (20–95)	NR	NR	A-DROP: 2 (1–4^)	NR	NR	NR	NR
	Penicillin-intermediate *Streptococcus Pneumoniae* Group C	48	77 (58–95)	NR	NR	A-DROP: 2 (1–4^)	NR	NR	NR	NR
	Penicillin-susceptible *Streptococcus Pneumoniae*: Group A	65	72 (20–92)	NR	NR	A-DROP: 2 (1–4^)	NR	NR	NR	NR
	Penicillin-	70	73.5 (24–	NR	NR	A-	NR	NR	NR	NR

First author, year [Reference]	Groups	N	Age Median (IQR)	Gender (Male %)	BMI (kg/m^2) Mean (SD)	Severity of disease Median (IQR)	CCI Median (IQR)	Co-morbidity %	Mode of acquisition, %	Source of bacteremia %
	susceptible *Streptococcus Pneumoniae*: Group B		99)			DROP: 2 (1–4[^])				
	Penicillin-susceptible *Streptococcus Pneumoniae*: Group C	52	73 (22–97)	NR	NR	A-DROP: 2 (1–4[^])	NR	NR	NR	NR

[*]Mean and SD, [^]median and range, [!]days 2–3: (n=244), days 5–7: (n=243), [#]patient/day/year, [ˁ]unknown measure, [~]classified according to international guidelines for management of severe sepsis and septic shock.

Abbreviations: A-DROP, Age dehydration, respiratory failure, orientation disturbance, and low blood pressure; AIDS, Acquired immunodeficiency syndrome; APACHE II, Acute physiology and chronic health evaluation; ASP, Antimicrobial stewardship program; AST, Antimicrobial stewardship team; BMI, Body mass index; BSI, Bloodstream infection; CAP, Community-acquired pneumonia; CCI, Charlson Comorbidity Index; CNS, Central nervous system; COPD, Chronic obstructive pulmonary disease; CPE, Carbapenemase-producing *Enterobacteriaceae*; CRBSI, Catheter-related bloodstream infection; DIC, Disseminated intravascular coagulation; ESBL, Extended-spectrum beta-lactamases; GCS, Glasgow coma scale; HAP, Hospital-acquired pneumonia; HIV, Human immunodeficiency virus; IE, Infectious endocarditis; IQR, Interquartile range; IROAD, Immunodeficiency, respiration, orientation, age and dehydration; MDR, Multidrug resistance; MDRP, Multi-drug resistant *Pseudomonas aeruginosa*; MRSA, Methicillin-resistant *Staphylococcus aureus*; MSSA, Methicillin-susceptible *Staphylococcus aureus*; NHCAP, Nursing and healthcare-associated pneumonia; NR: Not reported; PCR, Polymerase chain reaction; PORT, Pneumonia outcomes research team; PRSP, Penicillin-resistant *Streptococcus pneumoniae*; PSI, Pneumonia severity index; PSM, Propensity score matching; qSOFA, quick Sepsis-related Organ Failure Assessment; SD, Standard deviation; SOFA, Sequential Organ Failure Assessment; UTI, Urinary tract infection; VRE, Vancomycin-resistant *Enterococci*.

Supplementary Table 7: In-hospital mortality in AMR groups

First author, year [Reference]	Group	Subgroup	Timepoint (days)	N	Mortality, n (%)	p-value
Shimizu 2022 [1]	MRSA bacteremia	NA	30	41	7 (17)	NR
	MRSA bacteremia	SCCmec type 1	30	1	1 (100)	NR
	MRSA bacteremia	SCCmec type 2	30	5	1 (20)	NR
	MRSA bacteremia	SCCmec type 4	30	34	5 (15)	NR
	MRSA bacteremia	SCCmec type 5	30	1	0 (0)	NR
	MRSA bacteremia	Community-acquired MRSA	30	35	5 (14)	NR
	MRSA bacteremia	Health care acquired MRSA	30	6	2 (33)	NR
	MRSA bacteremia	Gentamicin (MIC ≥16 μg/mL)	30	21	5 (24)	NR
	MRSA bacteremia	Erythromycin (MIC ≥8 μg/mL)	30	34	6 (18)	NR
	MRSA bacteremia	Clindamycin (MIC ≥4 μg/mL)	30	15	1 (7)	NR
	MRSA bacteremia	Minocycline (MIC ≥16 μg/mL)	30	11	3 (27)	NR
	MRSA bacteremia	Ciprofloxacin (MIC ≥8 μg/mL)	30	35	6 (17)	NR
	MRSA bacteremia	CC8	30	25	6 (24)	NR
Sakamoto 2021 [3]	MRSA pneumonia	NA	NR	3102	967 (31.2)	<0.001
	Non-MRSA pneumonia	NA	NR	12,320	1429 (11.6)	NA
	MRSA pneumonia	NA	30	3102	382 (12.3)	<0.001
	Non-MRSA pneumonia	NA	30	12,320	1011 (8.2)	NA
	MRSA pneumonia	NA	90	3102	809 (26.1)	<0.001
	Non-MRSA pneumonia	NA	90	12,320	1330 (10.8)	NA
Tsuzuki 2021 [4]	MSSA bacteremia	NA	NR	84	12 (14.3)	NR
	MRSA bacteremia	NA	NR	63	24 (38.1)	NR
	MSSA bacteremia (After PSM)	NA	NR	60	9 (15)	0.012

First author, year [Reference]	Group	Subgroup	Timepoint (days)	N	Mortality, n (%)	p-value
	MRSA bacteremia (After PSM)	NA	NR	60	22 (36.7)	NA
Umemura 2020 [7]	MRSA infections	NA	NR	40	19 (47.5)	NR
	MSSA infections	NA	NR	85	27 (30.5)	NR
Miyazaki 2020 [11]	MRSA pneumonia	Hospital acquired Pneumonia	30	76	26 (34.2)	NR
	MRSA pneumonia	Nursing and healthcare-associated pneumonia	30	95	29 (30.5)	NR
	MRSA pneumonia	Community-acquired Pneumonia	30	25	10 (40.0)	NR
	MRSA pneumonia	NA	30	199	66 (33.2)	NR
	MRSA pneumonia	Vancomycin-treated patients MIC: ≤1 μg/mL	30	91	29 (31.9)	0.72
	MRSA pneumonia	Vancomycin-treated patients MIC: >1 μg/mL	30	9	2 (22.2)	NA
	MRSA pneumonia	Vancomycin-treated patients with TDM	30	93	24 (25.8)	0.01
	MRSA pneumonia	Vancomycin-treated patients without TDM	30	40	19 (47.5)	NA
Yuasa 2019 [14]	MRSA infection	NA	NR	365	40 (11)	NR
	MRSA infection	Bacteremia	NR	120	14 (11.7)	NR
	MRSA infection	Pneumonia	NR	88	15 (17)	NR
	MRSA infection	Surgical site infection	NR	23	0 (0)	NR
	MRSA infection	Others	NR	32	3 (9.4)	NR
	MRSA infection	Unknown	NR	102	8 (7.8)	NR
Uematsu 2018 [16]	MRSA infections	NA	NR	7,188	1,221 (17)	<0.001
	MSSA infections	NA	NR	7,717	1,005 (13)	NA
Shime 2018	MRSA infection: All patients	NA	30	245	30 (12.2)	NR

First author, year [Reference]	Group	Subgroup	Timepoint (days)	N	Mortality, n (%)	p-value
[19]	Vancomycin: MRSA infection	NA	30	174	25 (14.4)	NR
	Linezolid: MRSA infection	NA	30	38	3 (7.9)	NR
	Daptomycin: MRSA infection	NA	30	11	1 (9.1)	NR
	Teicoplanin: MRSA infection	NA	30	22	1 (4.5)	NR
	All patients (MRSA infection)	Highest trough concentrations of vancomycin, 5.0–9.9 mg/dL	30	11	3 (27.3)	NR
	All patients (MRSA infection)	Highest trough concentrations of vancomycin, 10.0–14.9 mg/dL	30	31	2 (6.5)	NR
	All patients (MRSA infection)	Highest trough concentrations of vancomycin, 15.0–19.9 mg/dL	30	40	7 (17.5)	NR
	All patients (MRSA infection)	Highest trough concentrations of vancomycin, 20.0–24.9 mg/dL	30	32	2 (6.3)	NR
	All patients (MRSA infection)	Highest trough concentrations of vancomycin, ≥25.0 mg/dL	30	28	6 (21.4)	NR
	All patients (MRSA infection)	Highest trough concentrations of vancomycin, Not measured	30	32	5 (15.6)	NR
	All patients (MRSA infection)	Highest trough concentrations of vancomycin, Total	30	174	25 (14.4)	NR
	All patients (MRSA infection)	History of MRSA infection	30	27	1 (4)	0.25
	All patients (MRSA infection)	No history of MRSA infection	30	NR	NR (13)	NA
	All patients (MRSA infection)	Concordance of initial anti-MRSA therapy with practice guidelines	30	217	28 (12.9)	0.38
	All patients (MRSA infection)	Non-concordance of initial anti-MRSA therapy with practice guidelines	30	28	2 (7.1)	NA
Uematsu 2017 [20]	Anti-MRSA drug group	NA	NR	93838	21459 (22.9)	NR
	Control group	NA	NR	2181827	136495 (6.26)	NR

First author, year [Reference]	Group	Subgroup	Timepoint (days)	N	Mortality, n (%)	p-value
	Non-infection group	NA	NR	5496385	176429 (3.21)	NR
	Anti-MRSA drug group	Surgical Inpatients	NR	49787	9471 (19)	NR
	Control group	Surgical Inpatients	NR	1028484	33888 (3.29)	NR
	Anti-MRSA drug group	Non-surgical Inpatients	NR	44051	11988 (27.2)	NR
	Control group	Non-surgical Inpatients	NR	1153343	102607 (8.9)	NR
Uematsu 2016 [21]	Anti-MRSA drug group (Unadjusted)	NA	NR	634	143 (22.6)	<0.001
	Control group (Unadjusted)	NA	NR	87,427	5,432 (6.2)	NA
	Anti-MRSA drug group (PSM)	NA	NR	633	143 (22.6)	<0.001
	Control group (PSM)	NA	NR	633	77 (12.2)	NA
Shoji 2015 [23]	MRSA bacteremia	NA	30	140	41 (29.3)	NR
Seki 2015 [24]	MRSA infection-positive patients: PCR+Culture+	NA	NR	9	2 (22)	0.595
	MRSA infection-positive patients: PCR+Culture-	NA	NR	3	0	NA
	MRSA infection-positive patients: PCR-Culture+	NA	NR	3	1 (33)	NA
Kaku 2014 [25]	MRSA bacteremia	2008 and 2011	7	83	10 (12)	NR
	MRSA bacteremia	2008 and 2011	30	83	15 (18.1)	NR
	MRSA bacteremia	2008 and 2011	NR	83	21 (25.3)	0.047
	MRSA bacteremia	2003 and 2007	NR	NR	NR (39.8)	NA
	Vancomycin: MRSA bacteremia	2003 and 2007	NR	22	13 (59.1)	0.004
	Vancomycin: MRSA bacteremia	2008 and 2011	NR	37	8 (21.6)	NA
	Teicoplanin: MRSA bacteremia	2003 and 2007	NR	33	11 (33.3)	0.709
	Teicoplanin: MRSA bacteremia	2008 and 2011	NR	11	3 (27.3)	NA

First author, year [Reference]	Group	Subgroup	Timepoint (days)	N	Mortality, n (%)	p-value
	Linezolid: MRSA bacteremia	2003 and 2007	NR	11	3 (27.2)	0.69
	Linezolid: MRSA bacteremia	2008 and 2011	NR	18	5 (27.8)	NA
	No use of anti-MRSA agents: MRSA bacteremia	2003 and 2007	NR	14	6 (42.9)	0.699
	No use of anti-MRSA agents: MRSA bacteremia	2008 and 2011	NR	16	5 (31.3)	NA
	MRSA bacteremia	SCCmec types I: 2008 and 2011	30	18	2 (11.1)	NR
	MRSA bacteremia	SCCmec types II: 2008 and 2011	30	35	8 (22.9)	NR
	MRSA bacteremia	SCCmec types IV: 2008 and 2011	30	24	4 (16.7)	NR
	MRSA bacteremia	Presence of virulence genes	30	NR	NR (17)	NR
	MRSA bacteremia	Absence of virulence genes	30	NR	NR (19)	NR
Isobe 2012 [29]	MRSA bacteremia	NA	30	115	46 (40)	NR
	MRSA bacteremia	ICT: Positive patients	30	28	6 (21.4)	0.0211
	MRSA bacteremia	ICT: Negative patients	30	87	40 (46)	NA
Yamagata 2020 [31]	MRSA pneumonia	NA	30	11	4 (36.4)	NR
	Drug-resistant pathogens pneumonia	NA	30	38	6 (15.8)	NR
Shoji 2016 [33]	Methicillin-susceptive *staphylococci* osteomyelitis infection	NA	NA	55	3 (5.5)	NA
	Methicillin-resistant *staphylococci* osteomyelitis infection	NA	NA	16	4 (25)	0.04
Mizokami 2013 [35]	MRSA pneumonia: Severe hypoalbuminemia	Vancomycin AUC/MIC values, <250 μg × h/mL	28	6	5 (83.7)	0.143
	MRSA pneumonia: non-severe hypoalbuminemia	Vancomycin AUC/MIC values, <250 μg × h/mL	28	11	8 (75.3)	NA

First author, year [Reference]	Group	Subgroup	Timepoint (days)	N	Mortality, n (%)	p-value
	MRSA pneumonia: Severe hypoalbuminemia	Vancomycin AUC/MIC values, = 250–450 μg × h/mL	28	8	4 (50.2)	<0.001
	MRSA pneumonia: non-severe hypoalbuminemia	Vancomycin AUC/MIC values, = 250–450 μg × h/mL	28	54	3 (5.5)	NA
	MRSA pneumonia: Severe hypoalbuminemia	Vancomycin AUC/MIC values, >450 μg × h/mL	28	9	9 (100)	<0.001
	MRSA pneumonia: non-severe hypoalbuminemia	Vancomycin AUC/MIC values, >450 μg × h/mL	28	6	2 (33.8)	NA
	MRSA pneumonia patients	NA	28	94	32 (34)	NR
	MRSA pneumonia	Vancomycin trough concentrations, <10 μg/mL	28	NR	NR (30.6)	0.603
	MRSA pneumonia	Vancomycin trough concentrations, 10-15 μg/mL	28	NR	NR (50.9)	NA
	MRSA pneumonia	Vancomycin trough concentrations, 15-20 μg/mL	28	NR	NR (37.0)	NA
	MRSA pneumonia	Vancomycin trough concentrations, >20 μg/mL	28	NR	NR (38.2)	NA
	MRSA pneumonia	Vancomycin area under the concentration curve, <250 μg*h/mL	28	NR	NR (77.5)	<0.001
	MRSA pneumonia	Vancomycin area under the concentration curve, 250-350 μg*h/mL	28	NR	NR (7.4)	NA
	MRSA pneumonia	Vancomycin area under the concentration curve, 350-450 μg*h/mL	28	NR	NR (19.4)	NA
	MRSA pneumonia	Vancomycin area under the concentration curve, >450 μg*h/mL	28	NR	NR (73.8)	NA
Imai 2022 [2]	Carbapenem-susceptible infections	NA	NR	9431	2062 (21.9)	NA

First author, year [Reference]	Group	Subgroup	Timepoint (days)	N	Mortality, n (%)	p-value
	Carbapenem-resistant infections	NA	NR	86	22 (25.6)	0.407
	Carbapenem-susceptible infections (After IPTW)	NA	NR	3,493	830 (23.8)	NA
	Carbapenem-resistant infections (After IPTW)	NA	NR	86	22 (25.6)	0.66
Hayakawa 2020 [10]	CPE infections	NA	NR	25	4 (16)	0.272
	Non-CPE infections	NA	NR	NR	5 (8.1)	NA
	CPE infections	NA	30	NR	3 (12.5)	0.349
	Non-CPE infections	NA	30	NR	3 (5.1)	NA
	CPE infections (PSM)	NA	NR	NR	2 (10.5)	NR
	Non-CPE infections (PSM)	NA	NR	NR	8 (11.8)	NR
	CPE infections (PSM)	NA	30	NR	1 (5.6)	NR
	Non-CPE infections (PSM)	NA	30	NR	2 (3.1)	NR
	CPE infections	Infection (not colonization)	NR	11	4 (36.4)	0.146
	Non-CPE infections	Infection (not colonization)	NR	22	2 (9.1)	NA
	CPE infections	Infection (not colonization)	30	11	3 (27.3)	0.126
	Non-CPE infections	Infection (not colonization)	30	NR	1 (5.3)	NA
Tetsuka 2019 [13]	Carbapenemase-producing *Enterobacter cloacae* complex infection	NA	30	20	1 (5)	NR
	Non-Carbapenemase-producing *Enterobacter cloacae* complex infection	NA	30	19	2 (11)	NR
	Carbapenemase-producing *Enterobacter cloacae* complex infection	NA	NR	20	3 (15)	NR

First author, year [Reference]	Group	Subgroup	Timepoint (days)	N	Mortality, n (%)	p-value
	Non-Carbapenemase-producing *Enterobacter cloacae* complex infection	NA	NR	19	2 (11)	NR
Kohno 2021 [5]	Vancomycin-resistant *Enterococci* infection	NA	NR	122	26 (21.3)	NR
	Vancomycin-resistant *Enterococci* infection	Infection due to Vancomycin-resistant *Enterococci*	NR	4	3 (75.0)	NR
Hamada 2015 [22]	Ampicillin-susceptible bacteremia	NA	28	85	7 (8.2)	0.004
	Ampicillin-resistant bacteremia	NA	28	58	15 (25.9)	NA
Hanada 2016 [34]	Penicillin resistance osteomyelitis infection	gPRSP (genotypic penicillin-resistant *Streptococcus Pneumoniae*)	28	127	33 (26.0)	NR
	Penicillin-intermediate resistant osteomyelitis infection	gPISP (genotypic penicillin-intermediate resistant *Streptococcus Pneumoniae*)	28	296	73 (24.7)	NR
	Penicillin-susceptible osteomyelitis infection	gPSSP (genotypic penicillin-susceptible *Streptococcus Pneumoniae*)	28	83	16 (19.3)	NR
Mitsuboshi 2020 [9]	ESBL-producing bacteremia (Non-PSM)	Age 65-84 years	30	110	15 (14)	1.0
	ESBL-producing bacteremia (Non-PSM)	Age ≥85 years	30	69	9 (13)	NA
	ESBL-producing bacteremia (PSM)	Age 65-84 years	30	65	8 (12)	1.0
	ESBL-producing bacteremia (PSM)	Age ≥85 years	30	65	8 (12)	NA
	Overall ESBL-producing bacteremia (Non-PSM)	NA	30	179	24 (13.4)	NR

First author, year [Reference]	Group	Subgroup	Timepoint (days)	N	Mortality, n (%)	p-value
Hattori 2018 [15]	Methicillin-resistant *Staphylococcus aureus*	*Staphylococcus aureus*	30	89	18 (20.2)	NR
	Fluoroquinolone-resistant	Escherichia coli	30	118	16 (13.6)	NR
	ESBL and fluoroquinolone-resistant	Escherichia coli	30	68	13 (19.1)	NR
	Carbapenem-resistant (Japan)	Escherichia coli	30	1	0	NR
	Fluoroquinolone-resistant	Klebsiella species	30	6	2 (33.3)	NR
	ESBL and fluoroquinolone-resistant	Klebsiella species	30	1	1 (100)	NR
	Carbapenem-resistant (CLSI)	Klebsiella species	30	1	0	NR
	Carbapenem-resistant (Japan)	Klebsiella species	30	1	0	NR
	Carbapenem-resistant (CLSI)	Enterobacter species	30	2	1 (50.0)	NR
	Carbapenem-resistant (Japan)	Enterobacter species	30	6	2 (33.3)	NR
	Fluoroquinolone-resistant	Pseudomonas species	30	13	4 (30.8)	NR
	Aminoglycoside resistant	Pseudomonas species	30	4	0	NR
	Carbapenem-resistant (CLSI)	Pseudomonas species	30	22	9 (40.9)	NR
	Multidrug-resistant *Pseudomonas aeruginosa*	Pseudomonas species	30	4	1 (25.0)	NR
	Fluoroquinolone-resistant	Acinetobacter species	30	3	0	NR
	Aminoglycoside resistant	Acinetobacter species	30	1	0	NR
	Carbapenem-resistant (CLSI)	Acinetobacter species	30	2	0	NR
	Multidrug-resistant Acinetobacter species	Acinetobacter species	30	3	0	NR
Kainuma 2018 [17]	Fluoroquinolone-resistant *Pseudomonas aeruginosa* infections: exoS─exoU+ genotype	NA	NR	36	7 (19.5)	NR

First author, year [Reference]	Group	Subgroup	Timepoint (days)	N	Mortality, n (%)	p-value
	Fluoroquinolone-resistant *Pseudomonas aeruginosa* infections: exoS+exoU─ genotype	NA	NR	5	2 (40)	NR
	Fluoroquinolone-resistant *Pseudomonas aeruginosa* infections: exoS─exoU+ genotype	ST357	NR	33	6 (18.2)	NR
	Fluoroquinolone-resistant *Pseudomonas aeruginosa* infections: All genotype	Other type (ST235, ST186, ST244, ST314, ST508, and ST512)	NR	NR	3 (NR)	NR
	Fluoroquinolone-resistant *Pseudomonas aeruginosa*	NA	NR	41	9 (22)	NR
Nagao 2013 [27]	Multidrug-resistant isolates (nosocomial bloodstream infections)	*Staphylococcus aureus*	NR	393	114 (29)	NR
	Multidrug-resistant isolates (nosocomial bloodstream infections)	Escherichia coli	NR	62	13 (21)	NR
	Multidrug-resistant isolates (nosocomial bloodstream infections)	Klebsiella species	NR	38	2 (5.8)	NR
	Multidrug-resistant isolates (nosocomial bloodstream infections)	*Pseudomonas aeruginosa*	NR	5	3 (60)	NR
Shindo 2013 [28]	With CAP drug-resistant pathogens (CAP-DRPs)	NA	30	119	25 (21)	NR
	Without CAP drug-resistant pathogens (CAP-DRPs)	NA	30	627	64 (10.2)	NR
Yamada 2019 [32]	Resistant Gram-negative SPACE bacteremia (Serratia species, Pseudomonas aeruginosa,	Pre-ASP group	30	93	19 (20.4)	0.04

First author, year [Reference]	Group	Subgroup	Timepoint (days)	N	Mortality, n (%)	p-value
	Acinetobacter species, Citrobacter species, Enterobacter species)					
	Resistant Gram-negative SPACE bacteremia (Serratia species, Pseudomonas aeruginosa, Acinetobacter species, Citrobacter species, Enterobacter species)	Post-ASP group	30	124	13 (10.5)	NA
	Resistant Gram-negative SPACE bacteremia (Serratia species, Pseudomonas aeruginosa, Acinetobacter species, Citrobacter species, Enterobacter species)	Pre-ASP group	NR	93	26 (28)	0.03
	Resistant Gram-negative SPACE bacteremia (Serratia species, Pseudomonas aeruginosa, Acinetobacter species, Citrobacter species, Enterobacter species)	Post-ASP group	NR	124	20 (16.1)	NA
	Resistant Gram-negative bacteremia: Pseudomonas aeruginosa	Pre-ASP group	30	36	8 (22.2)	0.09
	Resistant Gram-negative bacteremia: Pseudomonas aeruginosa	Post-ASP group	30	35	2 (5.7)	NA
	Resistant Gram-negative bacteremia: Acinetobacter species	Pre-ASP group	30	11	4 (36.3)	0.04
	Resistant Gram-negative bacteremia: Acinetobacter species	Post-ASP group	30	12	0	NA
Fukushima 2022 [36]	MRSA: Before AST group	NA	30	16	3 (18.8)	NR
	MRSA: After AST group	NA	30	51	10 (19.6)	NR
	MRSA: Before AST group	NA	NR	16	6 (37.5)	NR

First author, year [Reference]	Group	Subgroup	Timepoint (days)	N	Mortality, n (%)	p-value
	MRSA: After AST group	NA	NR	51	18 (35.3)	NR
Ueda 2022 [37]	ESBL: Cefmetazole-2-time group	NA	30	23	0 (0)	NR
	ESBL: Cefmetazole-3-time group	NA	30	23	2 (8.7)	NR
Kawamura 2017 [44]	MRSA patients	NA	30	NR	NR (20.3)	NR
Sasaki 2015 [45]	Patients with MRSA	NA	NR	NR	NR (14.7)	<0.05
Natatsuka 2013 [51]	MRSA patients (All patients)	MRSA covered	30	4	0 (0)	NR
	MRSA patients (All patients)	MRSA Non-covered	30	16	2 (12.5)	NR
	MRSA patients (All patients)	*Pseudomonas aeruginosa* covered	30	6	1 (16.7)	NR
	MRSA patients (All patients)	*Pseudomonas aeruginosa* non-covered	30	9	2 (22.2)	NR
	MRSA patients (All patients)	MRSA covered	NR	4	1 (25)	NR
	MRSA patients (All patients)	MRSA Non-covered	NR	16	2 (12.5)	NR
	MRSA patients (All patients)	*Pseudomonas aeruginosa* covered	NR	6	1 (16.7)	NR
	MRSA patients (All patients)	*Pseudomonas aeruginosa* non-covered	NR	9	2 (22.2)	NR
	MRSA patients (All patients)	MRSA covered	NR	4[×]	0 (0)	NR
	MRSA patients (All patients)	MRSA Non-covered	NR	16[×]	3 (18.8)	NR
	MRSA patients (All patients)	*Pseudomonas aeruginosa* covered	NR	6[×]	2 (33.3)	NR
	MRSA patients (All patients)	*Pseudomonas aeruginosa* non-covered	NR	9[×]	2 (22.2)	NR
	MRSA patients (Under)	NA	NR	61	8 (13.1)	NR
	MRSA patients (Proper)	NA	NR	127	19 (15)	NR
	MRSA patients (Over)	NA	NR	38	8 (21.1)	NR

First author, year [Reference]	Group	Subgroup	Timepoint (days)	N	Mortality, n (%)	p-value
	MRSA patients (Under)	NA	30	61	4 (6.6)	NR
	MRSA patients (Proper)	NA	30	127	16 (12.6)	NR
	MRSA patients (Over)	NA	30	38	7 (18.4)	NR
	MRSA patients (Under)	NA	NR	61×	14 (23)	NR
	MRSA patients (Proper)	NA	NR	127×	15 (11.8)	NR
	MRSA patients (Over)	NA	NR	38×	9 (23.7)	NR
Matsuda 2013 [41]	MRSA: Microorganisms isolated for the first time	NA	NA	41	19 (46.3)	NR
Hanaoka 2013 [52]	MDRP infection (previous period)	NA	NA	15	11 (73.3)	<0.047
	No MDRP infection (Previous period)	NA	NA	71	32 (45)	NA
	MDRP infection (latter period)	NA	NA	17	8 (47.1)	0.13
Iwabuchi 2013 [53]	Methicillin-resistant staphylococcal sepsis	NA	NA	40	29 (72.5	NR
Sano 2012 [54]	Patients with MRSA	NA	NA	169	53 (31.4)	1.0
	Patients with MRSA	Causative bacteria	NA	29	10 (32.9)	NR
	Patients with MRSA	Colonization bacteria	NA	140	34 (24.1)	NR
Furukawa 2012 [43]	MRSA patients	Number of detection sites: 1-2 locations	NA	71	32 (45.0)	<0.047
	MRSA patients	Number of detection sites: 3 or more locations	NA	17	8 (47.1)	0.13
Suehiro 2012 [55]	Patients with MRSA	NA	NA	36	4 (11.1)	NR
	ESBL-producing bacteria	NA	NA	10	1 (10)	NR

×Death (Treatment failure).

Abbreviations: ASP, antibiotic stewardship programs; AST, antibiotic stewardship team; AUC, area under the curve; CAP, community-acquired pneumonia; CAP-DRP, community-acquired pneumonia drug-resistant pathogens; CLSI, clinical and laboratory standards institute; CPE, carbapenemase-producing *Enterobacteriaceae*; ESBL, extended-spectrum betalactamase; gPISP, genotypic penicillin-intermediate resistant *Streptococcus pneumoniae*; gPRSP, genotypic penicillin-resistant *Streptococcus pneumoniae*; gPSSP, genotypic penicillin-susceptible *Streptococcus pneumoniae*; ICT, infection-

First author, year [Reference]	Group	Subgroup	Timepoint (days)	N	Mortality, n (%)	p-value
control team; IPTW, inverse probability of treatment weighting; MDRP, multidrug-resistant *Pseudomonas aeruginosa*; MIC, minimum inhibitory concentration; MRSA, methicillin-resistant *Staphylococcus aureus*; MSSA, methicillin-susceptible *Staphylococcus aureus*; NA, not applicable; NR, not reported; PCR, polymerase chain reaction; PSM, propensity score matching; SCC mec, staphylococcal cassette chromosome mec; SPACE, serratia species pseudomonas aeruginosa acinetobacter species, citrobacter species, enterobacter species; TDM, therapeutic drug monitoring.						

Supplementary Table 8: Length of stay in AMR groups

First author, year [Reference]	Group	Subgroup	N	LOS (days) Median (IQR)	p-value
Sakamoto 2021 [3]	MRSA pneumonia	NA	3,102	35 (22–62)	<0.001
	Non-MRSA pneumonia	NA	12,320	14 (9–23)	NA
Tsuzuki 2021 [4]	MSSA bacteremia	NA	84	40 (27.5–64.5)	NR
	MRSA bacteremia	NA	63	66 (37.5–87)	NR
	MSSA bacteremia	After blood culture submission by strain	84	32 (22–59.5)	NR
	MRSA bacteremia	After blood culture submission by strain	63	43 (23–62)	NR
	MSSA bacteremia (After PSM)	NA	60	46 (28.5–64.5)	0.02
	MRSA bacteremia (After PSM)	NA	60	66 (40–91)	NA
	MSSA bacteremia (After PSM)	After blood culture submission by strain	60	38 (25–62.5)	0.691
	MRSA bacteremia (After PSM)	After blood culture submission by strain	60	45 (24–63)	NA
Fukuda 2020 [8]	Non-surgical site infection (After PSM)	Amputation (Anti-MRSA antibiotics for ≥7 days with debridement [base case])	NR	49.2 (1.8) *	<0.001
	MRSA surgical site infection (After PSM)	Amputation (Anti-MRSA antibiotics for ≥7 days with debridement [base case])	NR	118.6 (4.3) *	NA
	Non-surgical site infection (After PSM)	Amputation (Anti-MRSA antibiotics for ≥5 days with debridement)	NR	49.5 (1.7) *	<0.001
	MRSA surgical site infection (After PSM)	Amputation (Anti-MRSA antibiotics for ≥5 days with debridement)	NR	117.6 (4) *	NA
	Non-surgical site infection (After PSM)	Amputation (Anti-MRSA antibiotics for ≥7 days)	NR	53.3 (1.2) *	<0.001
	MRSA surgical site infection (After PSM)	Amputation (Anti-MRSA antibiotics for ≥7 days)	NR	105.3 (2.4) *	NA
	Non-surgical site infection (After PSM)	Amputation (Anti-MRSA antibiotics for ≥5 days)	NR	53.4 (1.2) *	<0.001
	MRSA surgical site infection (After PSM)	Amputation (Anti-MRSA antibiotics for ≥5 days)	NR	102.9 (2.2) *	NA
	Non-surgical site infection (After PSM)	Spinal fusion (Anti-MRSA antibiotics for ≥7 days with debridement [base case])	NR	29.3 (0.7) *	<0.001
	MRSA surgical site infection (After PSM)	Spinal fusion (Anti-MRSA antibiotics for ≥7 days with debridement [base case])	NR	90.4 (2) *	NA
	Non-surgical site infection (After PSM)	Spinal fusion (Anti-MRSA antibiotics for ≥5 days with debridement)	NR	29.2 (0.6) *	<0.001

First author, year [Reference]	Group	Subgroup	N	LOS (days) Median (IQR)	p-value
	MRSA surgical site infection (After PSM)	Spinal fusion (Anti-MRSA antibiotics for ≥5 days with debridement)	NR	87.8 (1.8) *	NA
	Non-surgical site infection (After PSM)	Spinal fusion (Anti-MRSA antibiotics for ≥7 days)	NR	30.2 (0.4) *	<0.001
	MRSA surgical site infection (After PSM)	Spinal fusion (Anti-MRSA antibiotics for ≥7 days)	NR	81.7 (1) *	NA
	Non-surgical site infection (After PSM)	Spinal fusion (Anti-MRSA antibiotics for ≥5 days)	NR	29 (0.3) *	<0.001
	MRSA surgical site infection (After PSM)	Spinal fusion (Anti-MRSA antibiotics for ≥5 days)	NR	78.1 (0.8) *	NA
	Non-surgical site infection (After PSM)	Open reduction of fracture (Anti-MRSA antibiotics for ≥7 days with debridement [base case])	NR	32.5 (0.8) *	<0.001
	MRSA surgical site infection (After PSM)	Open reduction of fracture (Anti-MRSA antibiotics for ≥7 days with debridement [base case])	NR	122 (3.2) *	NA
	Non-surgical site infection (After PSM)	Open reduction of fracture (Anti-MRSA antibiotics for ≥5 days with debridement)	NR	32.9 (0.9) *	<0.001
	MRSA surgical site infection (After PSM)	Open reduction of fracture (Anti-MRSA antibiotics for ≥5 days with debridement)	NR	123.6 (3.4) *	NA
	Non-surgical site infection (After PSM)	Open reduction of fracture (Anti-MRSA antibiotics for ≥7 days)	NR	39 (0.5) *	<0.001
	MRSA surgical site infection (After PSM)	Open reduction of fracture (Anti-MRSA antibiotics for ≥7 days)	NR	112.3 (1.6) *	NA
	Non-surgical site infection (After PSM)	Open reduction of fracture (Anti-MRSA antibiotics for ≥5 days)	NR	39.1 (0.6) *	<0.001
	MRSA surgical site infection (After PSM)	Open reduction of fracture (Anti-MRSA antibiotics for ≥5 days)	NR	108.3 (1.6) *	NA
	Non-surgical site infection (After PSM)	Hip prosthesis (Anti-MRSA antibiotics for ≥7 days with debridement [base case])	NR	43.1 (1.6) *	<0.001
	MRSA surgical site infection (After PSM)	Hip prosthesis (Anti-MRSA antibiotics for ≥7 days with debridement [base case])	NR	118.1 (4.3) *	NA
	Non-surgical site infection (After PSM)	Hip prosthesis (Anti-MRSA antibiotics for ≥5 days with debridement)	NR	38.7 (1.2) *	<0.001
	MRSA surgical site infection (After PSM)	Hip prosthesis (Anti-MRSA antibiotics for ≥5	NR	114.6 (3.5) *	NA

First author, year [Reference]	Group	Subgroup	N	LOS (days) Median (IQR)	p-value
		days with debridement)			
	Non-surgical site infection (After PSM)	Hip prosthesis (Anti-MRSA antibiotics for ≥7 days)	NR	41.4 (0.7) *	<0.001
	MRSA surgical site infection (After PSM)	Hip prosthesis (Anti-MRSA antibiotics for ≥7 days)	NR	101.1 (1.6) *	NA
	Non-surgical site infection (After PSM)	Hip prosthesis (Anti-MRSA antibiotics for ≥5 days)	NR	41 (0.6) *	<0.001
	MRSA surgical site infection (After PSM)	Hip prosthesis (Anti-MRSA antibiotics for ≥5 days)	NR	97.4 (1.3) *	NA
	Non-surgical site infection (After PSM)	Knee prosthesis (Anti-MRSA antibiotics for ≥7 days with debridement [base case])	NR	40.2 (1.7) *	<0.001
	MRSA surgical site infection (After PSM)	Knee prosthesis (Anti-MRSA antibiotics for ≥7 days with debridement [base case])	NR	115.1 (5) *	NA
	Non-surgical site infection (After PSM)	Knee prosthesis (Anti-MRSA antibiotics for ≥5 days with debridement)	NR	34.9 (1.4) *	<0.001
	MRSA surgical site infection (After PSM)	Knee prosthesis (Anti-MRSA antibiotics for ≥5 days with debridement)	NR	109.4 (4.5) *	NA
	Non-surgical site infection (After PSM)	Knee prosthesis (Anti-MRSA antibiotics for ≥7 days)	NR	34.9 (0.7) *	<0.001
	MRSA surgical site infection (After PSM)	Knee prosthesis (Anti-MRSA antibiotics for ≥7 days)	NR	85.1 (1.8) *	NA
	Non-surgical site infection (After PSM)	Knee prosthesis (Anti-MRSA antibiotics for ≥5 days)	NR	35.2 (0.7) *	<0.001
	MRSA surgical site infection (After PSM)	Knee prosthesis (Anti-MRSA antibiotics for ≥5 days)	NR	82 (1.7) *	NA
	Non-surgical site infection (After PSM)	Laminectomy (Anti-MRSA antibiotics for ≥7 days with debridement [base case])	NR	18.6 (1.3) *	<0.001
	MRSA surgical site infection (After PSM)	Laminectomy (Anti-MRSA antibiotics for ≥7 days with debridement [base case])	NR	59.2 (4) *	NA
	Non-surgical site infection (After PSM)	Laminectomy (Anti-MRSA antibiotics for ≥5 days with debridement)	NR	18.6 (1.2) *	<0.001
	MRSA surgical site infection (After PSM)	Laminectomy (Anti-MRSA antibiotics for ≥5 days with debridement)	NR	55.9 (3.7) *	NA
	Non-surgical site infection (After PSM)	Laminectomy (Anti-MRSA antibiotics for ≥7 days)	NR	21.4 (0.9) *	<0.001

First author, year [Reference]	Group	Subgroup	N	LOS (days) Median (IQR)	p-value
	MRSA surgical site infection (After PSM)	Laminectomy (Anti-MRSA antibiotics for ≥7 days)	NR	78.9 (3.4) *	<0.001
	Non-surgical site infection (After PSM)	Laminectomy (Anti-MRSA antibiotics for ≥5 days)	NR	22 (0.8) *	NA
	MRSA surgical site infection (After PSM)	Laminectomy (Anti-MRSA antibiotics for ≥5 days)	NR	73.4 (2.8) *	NR
	MRSA surgical site infection (After PSM)	Amputation (Attributable excess LOS)	1,151	69.4 (NR) *	NR
	MRSA surgical site infection (After PSM)	Spinal fusion (Attributable excess LOS)	1,279	61.1 (NR) *	NR
	MRSA surgical site infection (After PSM)	Open reduction of fracture (Attributable excess LOS)	1,046	89.5 (NR) *	NR
	MRSA surgical site infection (After PSM)	Hip prosthesis (Attributable excess LOS)	567	75 (NR) *	NR
	MRSA surgical site infection (After PSM)	Knee prosthesis (Attributable excess LOS)	257	74.9 (NR) *	NR
	MRSA surgical site infection (After PSM)	Laminectomy (Attributable excess LOS)	64	40.6 (NR) *	NR
Uematsu 2018 [16]	MRSA infections	NA	7,188	32 (22) *	<0.001
	MSSA infections	NA	7,717	28.7 (21) *	NA
Uematsu 2017 [20]	Anti-MRSA drug group	NA	93,838	51 (30-88) 75.7 (138) *	NR
	Control group	NA	2,181,827	16 (9–30) 25.7 (80.9) *	NR
	Non-infection group	NA	5,496,385	6 (3–12) 10.7 (31.9) *	NR
	Anti-MRSA drug group	Surgical Inpatients	49,787	60 (36–100) 86.8 (149) *	NR
	Control group	Surgical Inpatients	1,028,484	18 (10–34) 27.9 (82.2) *	NR
	Anti-MRSA drug group	Non-surgical Inpatients	44,051	43 (24–74) 63.2 (125) *	NR
	Control group	Non-surgical Inpatients	1,153,343	14 (8–27) 23.6 (79.7) *	NR
Uematsu 2016 [21]	Anti-MRSA drug group (Unadjusted)	NA	634	21 (14–33) 30.1 (28.7) *	<0.001
	Control group (Unadjusted)	NA	87,427	12 (9–20) 18.2 (23) *	NA
	Anti-MRSA drug group (PSM)	NA	633	21 (14–33)	<0.001

First author, year [Reference]	Group	Subgroup	N	LOS (days) Median (IQR)	p-value
				30.1 (28.8) *	
	Control group (PSM)	NA	633	14 (9–23) 21 (25) *	NA
	Anti-MRSA drug group (Unadjusted)	NA	88,061	NR 11.8 (1.5)!	<0.001
	Anti-MRSA drug group (PSM)	NA	1,266	9 (1.6)!	NA
	Anti-MRSA drug group (IPTW)	NA	88,061	10.4 (1.2)!	<0.001
Shoji 2015 [23]	MRSA bacteremia	Survivors	99	70 (42–118)	NA
	MRSA bacteremia	Non-Survivors	41	34 (15.5–73)	NA
Seki 2015 [24]	MRSA infection-positive patients: PCR+Culture+	NA	9	15.7 (15.6) *	0.004
	MRSA infection-positive patients: PCR+Culture-	NA	3	8.6 (7.1) *	NA
	MRSA infection-positive patients: PCR-Culture+	NA	3	24 (13.1) *	NA
Aoyagi 2014 [26]	Mutant MRSA bacteremia	NA	10	57 (35–93.3)	0.406
	Wild-type MRSA bacteremia	NA	41	37 (16–105)	NA
Isobe 2012 [29]	MRSA bacteremia	Survivors	69	58.4 (81.7) *	0.4843
	MRSA bacteremia	Non-Survivors	46	74 (91.2) *	NA
Kashimura 2012 [30]	MRSA SSI	Surgical site infection	12	34 (NR) *	NR
	MRSA SSI	Surgical site infection (Prolonged hospital stay)	12	19.3 (NR) * (9.9, 28.6ǂ)	NR
Saito 2021 [6]	Carbapenem-resistant infections group	After isolation	96	29.5 (14–63.8)	0.487
	Carbapenem-susceptible infections group	After isolation	96	26 (12.5–67.3)	NA
	Carbapenem-resistant infections group (PSM)	After isolation	NR	49.5 (33.2–68.3)	0.421
	Carbapenem-susceptible infections group (PSM)	After isolation	NR	60.4 (43.2–78.3)	NA
	Carbapenem-resistant infections group	After isolation excluding patients who died in hospital	96	43.5 (18–68.5)	0.687
	Carbapenem-susceptible infections group	After isolation excluding patients who died in hospital	96	31 (14–74.5)	NA
	Carbapenem-resistant infections group (PSM)	After isolation excluding patients who died in hospital	NR	61.9 (40.1–81.6)	0.710

First author, year [Reference]	Group	Subgroup	N	LOS (days) Median (IQR)	p-value
	Carbapenem-susceptible infections group (PSM)	After isolation excluding patients who died in hospital	NR	64.9 (45.8–86.7)	NA
Imai 2022 [2]	Carbapenem-susceptible infections	NA	9,431	46 (29–74)	NA
	Carbapenem-resistant infections	NA	86	64 (39–99)	<0.001
	Carbapenem-susceptible infections	Before culture test	9,431	13 (6–25)	NA
	Carbapenem-resistant infections	Before culture test	86	24 (10–57)	<0.001
	Carbapenem-susceptible infections	After culture test	9,431	27 (15–50)	NA
	Carbapenem-resistant infections	After culture test	86	30 (16–67)	0.132
	Carbapenem-susceptible infections (After IPTW)	NA	3,493	51 (31–81)	NA
	Carbapenem-resistant infections (After IPTW)	NA	86	63 (39–94)	0.004
	Carbapenem-susceptible infections (After IPTW)	Before culture test	3,493	16 (7–31)	NA
	Carbapenem-resistant infections (After IPTW)	Before culture test	86	22 (10–45)	0.017
	Carbapenem-susceptible infections (After IPTW)	After culture test	3,493	29 (16–50)	NA
	Carbapenem-resistant infections (After IPTW)	After culture test	86	30 (16–66)	0.253
Hayakawa 2020 [10]	CPE infections	NA	25	83 (41–150)	0.017
	Non-CPE infections	NA	63	45 (30–73)	NA
	CPE infections	Before isolation of CPE/non-CPE, days	25	24 (13–72)	0.01
	Non-CPE infections	Before isolation of CPE/non-CPE, days	63	14 (3–25)	NA
	CPE infections	After isolation of CPE/non-CPE excluding cases who died in hospital	25	46 (18–72)	0.091
	Non-CPE infections	After isolation of CPE/non-CPE excluding cases who died in hospital	63	29 (13–45)	NA
	CPE infections	After isolation of CPE/non-CPE	25	40 (18–72)	0.143
	Non-CPE infections	After isolation of CPE/non-CPE	63	29 (13–47)	NA
	CPE infections (PSM)	After isolation of CPE/non-CPE excluding cases who died in hospital	NR	58 (32–78)	NR
	Non-CPE infections (PSM)	After isolation of CPE/non-CPE excluding	NR	29 (16–42)	NR

First author, year [Reference]	Group	Subgroup	N	LOS (days) Median (IQR)	p-value
		cases who died in hospital			
Asai 2018 [18]	CRE infection	NA	NR[î]	121 (262) [*]	0.051
	CSE infection	NA	NR[î]	63 (87) [*]	NA
Kohno 2021 [5]	VRE Infection: Deceased	NA	26	22 (7–56)	0.1094
	VRE infection: Survived	NA	96	35 (15–78)	NA
Hamada 2015 [22]	Ampicillin-susceptible bacteremia	NA	85	23 (NR) NR (37.6) [*]	NA
	Ampicillin-resistant bacteremia	NA	58	28 (NR) NR (55) [*]	0.076
Naylor 2020 [12]	Non-*Staphylococcus aureus* BSI	NA	1,215,119	8 (4-17)	NR
	Staphylococcus aureus BSI	NA	4,017	34 (16-63)	NR
	Staphylococcus aureus BSI	NA	4,017	11.6 (NR) [*]	NR
	SA BSI resistant to 1st generation Cephalosporins	NA	1,393	13.7 (NR) [*]	NR
	SA BSI resistant to Carbapenems	NA	1,362	13.7 (NR) [*]	NR
	SA BSI resistant to Gentamicin	NA	1,334	10.3 (NR) [*]	NR
	SA BSI resistant to Fluroquinolones	NA	1,627	11.6 (NR) [*]	NR
	SA BSI resistant to Penicillin's	NA	2,751	12.9 (NR) [*]	NR
	SA BSI resistant to Oxacillin	NA	1,186	14.8 (NR) [*]	NR
Fukushima 2022 [36]	MRSA	Before AST	16	51 (7–161[^])	0.52
	MRSA	After AST	51	59 (5–451[^])	NA
Osumi 2021 [39]	ESBL: After the trend score match-Sensitive group	NA	25	17.7 (12.1) [*]	NA
	ESBL: After the trend score match-resistant group	NA	25	19.3 (22.8) [*]	0.444
Sasaki 2015 [45]	Patients with MRSA	NA	95	49.9 (NR) [*]	<0.05
Maeda 2014 [48]	Carbapenem drugs (without drug-resistant organisms)	NA	230	33.5 (33.2) [*]	NA
	Carbapenem drugs (with drug-resistant organisms)	NA	151	46.7 (43.1) [*]	0.002
Obara 2015 [46]	PRSP infection	All	52	2.79 (0.04–5.54[ł])	NR
	PRSP infection	5 to 65 years	13	4.31	NR

First author, year [Reference]	Group	Subgroup	N	LOS (days) Median (IQR)	p-value
				(–1.58, 10.19 ǂ)	
	PRSP infection	≥65 years	12	2.42 (–8.92, 13.75ǂ)	NR
Kosuge 2013 [49]	MDR bacteria	NA	14	107 (NR) *	0.014
	Bacteria other than MDR	NA	27	63.7 (NR) *	NA
Kobayashi 2013 [40]	MRSA infection	4 facilities that submitted individual data of each case (Facility 1)	NR	17 (NR) *	NR
	MRSA infection	4 facilities that submitted individual data of each case (Facility 2)	NR	14.06 (NR) *	NR
	MRSA infection	4 facilities that submitted individual data of each case (Facility 3)	NR	12 (NR) *	NR
	MRSA infection	4 facilities that submitted individual data of each case (Facility 4)	NR	16.7 (NR) *	NR
	MRSA infection	2 facilities that submitted individual data of health care fee: 2007	150	85.96 (69.55) *	NR
	MRSA infection	2 facilities that submitted individual data of health care fee: 2008	167	81.12 (66.94) *	NR
	MRSA infection	2 facilities that submitted individual data of health care fee: 2009	177	96.07 (88.11) *	NR
	MRSA infection	2 facilities that submitted individual data of health care fee: 2010	95	87.62 (69.9) *	NR
	MRSA infection	2 facilities that submitted individual data of health care fee: 2011	181	74.03 (63.47) *	NR
Sano 2012 [54]	Patients with MRSA	NA	169	47.7 (NR) *	NR
Ogasawara 2012 [42]	Resistance to Meropenem	NA	20	NR (1–379^) 14 (NR) *	N.S
	Non-resistance to Meropenem	NA	13	NR (1–72^) 11 (NR) *	NA
Furukawa 2012 [43]	MRSA patients	Number of detection sites 1~2 locations	206	46.8 (NR) *	<0.001
	MRSA patients	Number of detection sites 3 or more locations	52	80.6 (NR) *	NA
Suehiro 2012 [55]	Patients with MRSA + ESBL	46	NR	23.9 (18.1) *	NR
	Patients with MRSA	26	NR	26.1 (19.3) *	NR
	ESBL-producing bacteria	9	NR	15.9 (99.9) *	NR

First author, year [Reference]	Group	Subgroup	N	LOS (days) Median (IQR)	p-value
Uryu 2012 [56]	*Streptococcus Pneumoniae* Group A: itemized-payment period [2004/10~2006/05]	NR	124	12 (2–155^)	0.2814
	Streptococcus Pneumoniae Group B: pre-revision period [2006/06~2008/03]	NR	112	9 (2–106^)	0.2814
	Streptococcus Pneumoniae Group C: post-revision period [2008/04~2010/03]	NR	113	11 (2–119^)	0.2814
	Streptococcus Pneumoniae Group B: pre-revision period [2006/06~2008/03]	NR	112	9 (2–106^)	0.2814
	Streptococcus Pneumoniae Group C: post-revision period [2008/04~2010/03]	NR	113	11 (2–119^)	0.2814
	Streptococcus Pneumoniae Group A: itemized-payment period [2004/10~2006/05]	NR	124	12 (2–155^)	0.2814
	Streptococcus Pneumoniae Group B: pre-revision period [2006/06~2008/03]	NR	112	9 (2–106^)	0.2814
	Streptococcus Pneumoniae Group C: post-revision period [2008/04~2010/03]	NR	113	11 (2–119^)	0.2814
	Streptococcus Pneumoniae Group A: itemized-payment period [2004/10~2006/05]	NR	124	12 (2–155^)	0.2814
	Streptococcus Pneumoniae Group B: pre-revision period [2006/06~2008/03]	NR	112	9 (2–106^)	0.2814
	Streptococcus Pneumoniae Group C: post-revision period [2008/04~2010/03]	NR	113	11 (2–119^)	0.2814
	Streptococcus Pneumoniae Group A: itemized-payment period [2004/10~2006/05]	NR	124	12 (2–155^)	0.2814
	Streptococcus Pneumoniae Group B: pre-revision period [2006/06~2008/03]	NR	112	9 (2–106^)	0.2814
	Streptococcus Pneumoniae Group C: post-revision period [2008/04~2010/03]	NR	113	11 (2–119^)	0.2814
	Penicillin-resistant *Streptococcus Pneumoniae*: Group A	NR	6	14.5 (5–83^)	0.0551
	Penicillin-resistant *Streptococcus*	NR	2	18.5 (9–28^)	0.3429

First author, year [Reference]	Group	Subgroup	N	LOS (days) Median (IQR)	p-value
	Pneumoniae: Group B				
	Penicillin-resistant *Streptococcus Pneumoniae* Group C: PRSP	NR	11	10 (4–119^)	0.4812
	Penicillin-resistant *Streptococcus Pneumoniae* Group B: PRSP	NR	2	18.5 (9–28^)	0.3429
	Penicillin-resistant *Streptococcus Pneumoniae* Group C: PRSP	NR	11	10 (4–119^)	0.4812
	Penicillin-resistant *Streptococcus Pneumoniae*: Group A	NR	6	14.5 (5–83^)	0.0551
	Penicillin-resistant *Streptococcus Pneumoniae*: Group B	NR	2	18.5 (9–28^)	0.3429
	Penicillin-resistant *Streptococcus Pneumoniae*: Group C	NR	11	10 (4–119^)	0.4812
	Penicillin-resistant *Streptococcus Pneumoniae*: Group A	NR	6	14.5 (5–83^)	0.0551
	Penicillin-resistant *Streptococcus Pneumoniae*: Group B	NR	2	18.5 (9–28^)	0.3429
	Penicillin-resistant *Streptococcus Pneumoniae*: Group C	NR	11	10 (4–119^)	0.4812
	Penicillin-intermediate *Streptococcus Pneumoniae*: Group A	NR	53	14 (3–155^)	0.0551
	Penicillin-intermediate *Streptococcus Pneumoniae*: Group B	NR	40	12 (3–106^)	0.3429
	Penicillin-intermediate *Streptococcus Pneumoniae*: Group C	NR	48	11 (3–95^)	0.4812
	Penicillin-intermediate *Streptococcus Pneumoniae*: Group B	NR	40	12 (3–106^)	0.3429
	Penicillin-intermediate *Streptococcus Pneumoniae*: Group C	NR	48	11 (3–95^)	0.4812
	Penicillin-intermediate *Streptococcus Pneumoniae*: Group A	NR	53	14 (3–155^)	0.0551
	Penicillin-intermediate *Streptococcus Pneumoniae*: Group B	NR	40	12 (3–106^)	0.3429
	Penicillin-intermediate *Streptococcus Pneumoniae*: Group C	NR	48	11 (3–95^)	0.4812

First author, year [Reference]	Group	Subgroup	N	LOS (days) Median (IQR)	p-value
	Penicillin-intermediate *Streptococcus Pneumoniae*: Group A	NR	53	14 (3–155[^])	0.0551
	Penicillin-intermediate *Streptococcus Pneumoniae*: Group B	NR	40	12 (3–106[^])	0.3429
	Penicillin-intermediate *Streptococcus Pneumoniae*: Group C	NR	48	11 (3–95[^])	0.4812
	Penicillin-susceptible *Streptococcus Pneumoniae*: Group A	NR	65	10 (2–128[^])	0.0551
	Penicillin-susceptible *Streptococcus Pneumoniae*: Group B	NR	70	8.5 (2–80[^])	0.3429
	Penicillin-susceptible *Streptococcus Pneumoniae*: Group C	NR	52	11.5 (2–51[^])	0.4812
	Penicillin-susceptible *Streptococcus Pneumoniae*: Group B	NR	70	8.5 (2–80[^])	0.3429
	Penicillin-susceptible *Streptococcus Pneumoniae*: Group C	NR	52	11.5 (2–51[^])	0.4812
	Penicillin-susceptible *Streptococcus Pneumoniae*: Group A	NR	65	10 (2–128[^])	0.0551
	Penicillin-susceptible *Streptococcus Pneumoniae*: Group B	NR	70	8.5 (2–80[^])	0.3429
	Penicillin-susceptible *Streptococcus Pneumoniae*: Group C	NR	52	11.5 (2–51[^])	0.4812
	Penicillin-susceptible *Streptococcus Pneumoniae*: Group A	NR	65	10 (2–128[^])	0.0551
	Penicillin-susceptible *Streptococcus Pneumoniae*: Group B	NR	70	8.5 (2–80[^])	0.3429
	Penicillin-susceptible *Streptococcus Pneumoniae*: Group C	NR	52	11.5 (2–51[^])	0.4812

[i]only patients admitted to hospital were evaluated, [!]mean (SE), [*]mean (SD), [^]median (range), [ǂ]95% CI.

Abbreviations: AST, Antibiotic stewardship team; BSI, Bloodstream infection; CPE, Carbapenemase-producing *Enterobacteriaceae*; CRE, Carbapenem-resistant *Enterobacteriaceae*; CSE, Carbapenem-sensitive *Enterobacteriaceae*; ESBL, Extended-spectrum beta-lactamases; IPTW, Inverse probability of treatment weighting; IQR, Interquartile range; LOS, Length of stay; MDR, Multi-drug resistant; MRSA, Methicillin-resistant *Staphylococcus aureus*; MSSA, Methicillin-susceptible *Staphylococcus aureus*; NA, Not applicable; NR, Not reported; PCR, Polymerase chain reaction; PRSP, Penicillin-resistant *Streptococcus Pneumoniae*; PSM, Propensity score matching; SA BSAI, *Staphylococcus aureus* bloodstream infection; SSI, Surgical site infection; VRE, Vancomycin-resistant *Enterococci*.

Supplementary Table 9: Direct medical costs in AMR groups

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
Imai 2022 [2]	Carbapenem-susceptible infections	9,431	2021	USD	per patient	Total costs	20,077 (12,670–33,345)	NA
	Carbapenem-resistant infections	86	2021	USD	per patient	Total costs	27,501 (17,186–48,980)	<0.001
	Carbapenem-susceptible infections	9,431	2021	USD	per patient	Inter-consultations	143 (80–244)	NA
	Carbapenem-resistant infections	86	2021	USD	per patient	Inter-consultations	163 (96–312)	0.238
	Carbapenem-susceptible infections	9,431	2021	USD	per patient	Medication’s costs	1,609 (736–3571)	NA
	Carbapenem-resistant infections	86	2021	USD	per patient	Medication’s costs	3,477 (1,585–9,716)	<0.001
	Carbapenem-susceptible infections	9,431	2021	USD	per patient	Surgical procedures	2,327 (362–9,377)	NA
	Carbapenem-resistant infections	86	2021	USD	per patient	Surgical procedures	3,761 (572–12,239)	0.196
	Carbapenem-susceptible infections	9,431	2021	USD	per patient	Laboratory tests	1,845 (1,185–2,930)	NA
	Carbapenem-resistant infections	86	2021	USD	per patient	Laboratory tests	2,498 (1,666–4,640)	0.002
	Carbapenem-susceptible infections	9,431	2021	USD	per patient	Hospital stay	10,560 (6,789–16,304)	NA
	Carbapenem-resistant infections	86	2021	USD	per patient	Hospital stay	14,307 (9,790–22,471)	<0.001
	Carbapenem-susceptible infections (After IPTW)	3,493	2021	USD	per patient	Total costs	22,039 (14,321–34,108)	NA
	Carbapenem-resistant infections (After IPTW)	86	2021	USD	per patient	Total costs	26,866 (16,609–48,751)	0.004

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	Carbapenem-susceptible infections (After IPTW)	3,493	2021	USD	per patient	Inter-consultations	154 (81–250)	NA
	Carbapenem-resistant infections (After IPTW)	86	2021	USD	per patient	Inter-consultations	163 (95–309)	0.193
	Carbapenem-susceptible infections (After IPTW)	3,493	2021	USD	per patient	Medication’s costs	2,000 (889–4,748)	NA
	Carbapenem-resistant infections (After IPTW)	86	2021	USD	per patient	Medication’s costs	3,371 (1,580–8,960)	<0.001
	Carbapenem-susceptible infections (After IPTW)	3,493	2021	USD	per patient	Surgical procedures	4,042 (699–10,079)	NA
	Carbapenem-resistant infections (After IPTW)	86	2021	USD	per patient	Surgical procedures	3,727 (482–12,112)	0.899
	Carbapenem-susceptible infections (After IPTW)	3,493	2021	USD	per patient	Laboratory tests	2,189 (1,350–3,470)	NA
	Carbapenem-resistant infections (After IPTW)	86	2021	USD	per patient	Laboratory tests	2,491 (1,666–4,460)	0.012
	Carbapenem-susceptible infections (After IPTW)	3,493	2021	USD	per patient	Hospital stay	11,692 (7,349–17,267)	NA
	Carbapenem-resistant infections (After IPTW)	86	2021	USD	per patient	Hospital stay	13,947 (9,360–22,470)	<0.001
Sakamoto 2021 [3]	MRSA pneumonia	3,102	2014	USD	per patient	Hospitalization costs	12,156 (7,827–20,615)	<0.001
	Non-MRSA pneumonia	12,320	2014	USD	per patient	Hospitalization costs	4,665 (3,163–7,298)	NA
Tsuzuki 2021 [4]	All patients	147	2020	USD	per patient	Hospitalization costs	22,902 (15,699–43,330)	NR
	All patients	147	2020	USD	per patient	Hospitalization costs	488 (374–719)	NR

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
					per day			
	MSSA bacteremia	84	2020	USD	per patient	Hospitalization costs	20,884 (13,880–33,951)	NR
	MRSA bacteremia	63	2020	USD	per patient	Hospitalization costs	27,798 (18,252–47,543)	NR
	MSSA bacteremia	84	2020	USD	per patient per day	Hospitalization costs	401 (150–1,111)	NR
	MRSA bacteremia	63	2020	USD	per patient per day	Hospitalization costs	496 (231–1,215)	NR
	MSSA bacteremia (After PSM)	60	2020	USD	per patient	Hospitalization costs	19,823 (13,764–32,042)	NA
	MRSA bacteremia (After PSM)	60	2020	USD	per patient	Hospitalization costs	26,035 (18,154–47,362)	0.036
	MSSA bacteremia (After PSM)	60	2020	USD	per patient per day	Hospitalization costs	456 (359–702)	NA
	MRSA bacteremia (After PSM)	60	2020	USD	per patient per day	Hospitalization costs	529 (375–647)	0.99
	MSSA bacteremia	84	2020	USD	total	Total costs	2,339,668 [t]	NR
	MRSA bacteremia	63	2020	USD	total	Total costs	2,452,494 [t]	NR
	MSSA bacteremia	84	2020	USD	total	Drug costs	332,542 [t]	NR
	MRSA bacteremia	63	2020	USD	total	Drug costs	326,603 [t]	NR
	MSSA bacteremia	84	2020	USD	total	Treatment costs	344,418 [t]	NR
	MRSA bacteremia	63	2020	USD	total	Treatment costs	475,059 [t]	NR
	MSSA bacteremia	84	2020	USD	total	Examination costs	243,468 [t]	NR
	MRSA bacteremia	63	2020	USD	total	Examination costs	228,622 [t]	NR

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	MSSA bacteremia	84	2020	USD	total	Accommodation costs	1,448,931 [t]	NR
	MRSA bacteremia	63	2020	USD	total	Accommodation costs	1,229,216 [t]	NR
	MSSA bacteremia	84	2020	USD	total	Other costs	95,012 [t]	NR
	MRSA bacteremia	63	2020	USD	total	Other costs	77,197 [t]	NR
Fukuda 2020 [8]	Non-surgical site infection (Before PSM): AMP	15,769	2017	USD	per patient	Healthcare expenditure	1.7 (1.8) [*]	NA
	MRSA surgical site infection (Before PSM): AMP	1,152	2017	USD	per patient	Healthcare expenditure	2.2 (1.9) [*]	<0.001
	Non-surgical site infection (Before PSM): FUSN	369,655	2017	USD	per patient	Healthcare expenditure	0.5 (1.1) [*]	NA
	MRSA surgical site infection (Before PSM): FUSN	1,279	2017	USD	per patient	Healthcare expenditure	1.7 (2.5) [*]	<0.001
	Non-surgical site infection (Before PSM): FX	855,358	2017	USD	per patient	Healthcare expenditure	0.8 (1.4) [*]	NA
	MRSA surgical site infection (Before PSM): FX	1,046	2017	USD	per patient	Healthcare expenditure	1.6 (2.2) [*]	<0.001
	Non-surgical site infection (Before PSM): HPRO	371,527	2017	USD	per patient	Healthcare expenditure	0.7 (1.3) [*]	NA
	MRSA surgical site infection (Before PSM): HPRO	567	2017	USD	per patient	Healthcare expenditure	2.3 (2.4) [*]	<0.001
	Non-surgical site infection (Before PSM): KPRO	230,249	2017	USD	per patient	Healthcare expenditure	0.4 (0.9) [*]	NA
	MRSA surgical site infection (Before PSM): KPRO	257	2017	USD	per patient	Healthcare expenditure	1.4 (1.9) [*]	<0.001

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	Non-surgical site infection (Before PSM): LAM	154,588	2017	USD	per patient	Healthcare expenditure	0.2 (0.7) *	NA
	MRSA surgical site infection (Before PSM): LAM	64	2017	USD	per patient	Healthcare expenditure	0.7 (1.2) *	<0.001
	Non-surgical site infection (After PSM): AMP Anti-MRSA antibiotics for ≥7 days with debridement [base case])	NR	2017	USD	per patient	Healthcare expenditure	19,713 (499) *	NA
	MRSA surgical site infection (After PSM) AMP Anti-MRSA antibiotics for ≥7 days with debridement [base case])	NR	2017	USD	per patient	Healthcare expenditure	53,003 (1337) *	<0.001
	Non-surgical site infection (After PSM): AMP (Anti-MRSA antibiotics for ≥5 days with debridement)	NR	2017	USD	per patient	Healthcare expenditure	19,629 (471) *	NA
	MRSA surgical site infection (After PSM) AMP (Anti-MRSA antibiotics for ≥5 days with debridement)	NR	2017	USD	per patient	Healthcare expenditure	52,725 (1264) *	<0.001
	Non-surgical site infection (After PSM): AMP (Anti-MRSA antibiotics for ≥7 days)	NR	2017	USD	per patient	Healthcare expenditure	20,646 (322) *	NA
	MRSA surgical site infection (After PSM): AMP (Anti-MRSA antibiotics for ≥7 days)	NR	2017	USD	per patient	Healthcare expenditure	45,337 (707) *	<0.001
	Non-surgical site infection (After	NR	2017	USD	per patient	Healthcare	20,629 (316) *	NA

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	PSM): AMP (Anti-MRSA antibiotics for ≥5 days)					expenditure		
	MRSA surgical site infection (After PSM): AMP (Anti-MRSA antibiotics for ≥5 days)	NR	2017	USD	per patient	Healthcare expenditure	44,451 (680) *	<0.001
	Non-surgical site infection (After PSM): FUSN (Anti-MRSA antibiotics for ≥7 days with debridement [base case])	NR	2017	USD	per patient	Healthcare expenditure	19,603 (302) *	NA
	MRSA surgical site infection (After PSM): FUSN (Anti-MRSA antibiotics for ≥7 days with debridement [base case])	NR	2017	USD	per patient	Healthcare expenditure	48,461 (746) *	<0.001
	Non-surgical site infection (After PSM): FUSN (Anti-MRSA antibiotics for ≥5 days with debridement)	NR	2017	USD	per patient	Healthcare expenditure	20,043 (309) *	NA
	MRSA surgical site infection (After PSM): FUSN (Anti-MRSA antibiotics for ≥5 days with debridement)	NR	2017	USD	per patient	Healthcare expenditure	47,221 (729) *	<0.001
	Non-surgical site infection (After PSM): FUSN (Anti-MRSA antibiotics for ≥7 days)	NR	2017	USD	per patient	Healthcare expenditure	20,048 (164) *	NA
	MRSA surgical site infection (After PSM): FUSN (Anti-MRSA antibiotics for ≥7 days)	NR	2017	USD	per patient	Healthcare expenditure	45,091 (370) *	<0.001
	Non-surgical site infection (After PSM): FUSN (Anti-MRSA	NR	2017	USD	per patient	Healthcare expenditure	19,527 (149) *	NA

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	antibiotics for ≥5 days)							
	MRSA surgical site infection (After PSM): FUSN (Anti-MRSA antibiotics for ≥5 days)	NR	2017	USD	per patient	Healthcare expenditure	43,780 (335) *	<0.001
	Non-surgical site infection (After PSM): FX (Anti-MRSA antibiotics for ≥7 days with debridement [base case])	NR	2017	USD	per patient	Healthcare expenditure	14,429 (268) *	NA
	MRSA surgical site infection (After PSM): FX (Anti-MRSA antibiotics for ≥7 days with debridement [base case])	NR	2017	USD	per patient	Healthcare expenditure	50,122 (930) *	<0.001
	Non-surgical site infection (After PSM): FX (Anti-MRSA antibiotics for ≥5 days with debridement)	NR	2017	USD	per patient	Healthcare expenditure	14,305 (265) *	NA
	MRSA surgical site infection (After PSM): FX (Anti-MRSA antibiotics for ≥5 days with debridement)	NR	2017	USD	per patient	Healthcare expenditure	49,912 (925) *	<0.001
	Non-surgical site infection (After PSM): FX (Anti-MRSA antibiotics for ≥7 days)	NR	2017	USD	per patient	Healthcare expenditure	15,999 (150) *	NA
	MRSA surgical site infection (After PSM): FX (Anti-MRSA antibiotics for ≥7 days)	NR	2017	USD	per patient	Healthcare expenditure	41,271 (386) *	<0.001
	Non-surgical site infection (After PSM): FX (Anti-MRSA antibiotics for ≥5 days)	NR	2017	USD	per patient	Healthcare expenditure	15,975 (144) *	NA

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	MRSA surgical site infection (After PSM): FX (Anti-MRSA antibiotics for ≥5 days)	NR	2017	USD	per patient	Healthcare expenditure	39,937 (359) *	<0.001
	Non-surgical site infection (After PSM): HPRO (Anti-MRSA antibiotics for ≥7 days with debridement [base case])	NR	2017	USD	per patient	Healthcare expenditure	23,532 (486) *	NA
	MRSA surgical site infection (After PSM): HPRO (Anti-MRSA antibiotics for ≥7 days with debridement [base case])	NR	2017	USD	per patient	Healthcare expenditure	47,784 (986) *	<0.001
	Non-surgical site infection (After PSM): HPRO (Anti-MRSA antibiotics for ≥5 days with debridement)	NR	2017	USD	per patient	Healthcare expenditure	22,548 (411) *	NA
	MRSA surgical site infection (After PSM): HPRO (Anti-MRSA antibiotics for ≥5 days with debridement)	NR	2017	USD	per patient	Healthcare expenditure	47,140 (859) *	<0.001
	Non-surgical site infection (After PSM): HPRO (Anti-MRSA antibiotics for ≥7 days)	NR	2017	USD	per patient	Healthcare expenditure	22,746 (211) *	NA
	MRSA surgical site infection (After PSM): HPRO (Anti-MRSA antibiotics for ≥7 days)	NR	2017	USD	per patient	Healthcare expenditure	42,751 (395) *	<0.001
	Non-surgical site infection (After PSM): HPRO (Anti-MRSA antibiotics for ≥5 days)	NR	2017	USD	per patient	Healthcare expenditure	22,745 (194) *	NA
	MRSA surgical site infection	NR	2017	USD	per patient	Healthcare	41,632 (355) *	<0.001

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	(After PSM): HPRO (Anti-MRSA antibiotics for ≥5 days)					expenditure		
	Non-surgical site infection (After PSM): KPRO (Anti-MRSA antibiotics for ≥7 days with debridement [base case])	NR	2017	USD	per patient	Healthcare expenditure	22,453 (634) *	NA
	MRSA surgical site infection (After PSM): KPRO (Anti-MRSA antibiotics for ≥7 days with debridement [base case])	NR	2017	USD	per patient	Healthcare expenditure	47,120 (1,333) *	<0.001
	Non-surgical site infection (After PSM): KPRO (Anti-MRSA antibiotics for ≥5 days with debridement)	NR	2017	USD	per patient	Healthcare expenditure	20,901 (551) *	NA
	MRSA surgical site infection (After PSM): KPRO (Anti-MRSA antibiotics for ≥5 days with debridement)	NR	2017	USD	per patient	Healthcare expenditure	45,357 (1,197) *	<0.001
	Non-surgical site infection (After PSM): KPRO (Anti-MRSA antibiotics for ≥7 days)	NR	2017	USD	per patient	Healthcare expenditure	21,111 (293) *	NA
	MRSA surgical site infection (After PSM): KPRO (Anti-MRSA antibiotics for ≥7 days)	NR	2017	USD	per patient	Healthcare expenditure	39,493 (549) *	<0.001
	Non-surgical site infection (After PSM): KPRO (Anti-MRSA antibiotics for ≥5 days)	NR	2017	USD	per patient	Healthcare expenditure	21,280 (283) *	NA
	MRSA surgical site infection (After PSM): KPRO (Anti-MRSA	NR	2017	USD	per patient	Healthcare expenditure	38,296 (509) *	<0.001

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	antibiotics for ≥5 days)							
	Non-surgical site infection (After PSM): LAM (Anti-MRSA antibiotics for ≥7 days with debridement [base case])	NR	2017	USD	per patient	Healthcare expenditure	9,521 (378) *	NA
	MRSA surgical site infection (After PSM): LAM (Anti-MRSA antibiotics for ≥7 days with debridement [base case])	NR	2017	USD	per patient	Healthcare expenditure	21,151 (835) *	<0.001
	Non-surgical site infection (After PSM): LAM (Anti-MRSA antibiotics for ≥5 days with debridement)	NR	2017	USD	per patient	Healthcare expenditure	9,312 (354) *	NA
	MRSA surgical site infection (After PS:M): LAM (Anti-MRSA antibiotics for ≥5 days with debridement)	NR	2017	USD	per patient	Healthcare expenditure	20,314 (767) *	<0.001
	Non-surgical site infection (After PSM): LAM (Anti-MRSA antibiotics for ≥7 days)	NR	2017	USD	per patient	Healthcare expenditure	10,658 (310) *	NA
	MRSA surgical site infection (After PSM): LAM (Anti-MRSA antibiotics for ≥7 days)	NR	2017	USD	per patient	Healthcare expenditure	29,416 (851) *	<0.001
	Non-surgical site infection (After PSM): LAM (Anti-MRSA antibiotics for ≥5 days)	NR	2017	USD	per patient	Healthcare expenditure	10,707 (290) *	NA
	MRSA surgical site infection (After PSM): LAM (Anti-MRSA antibiotics for ≥5 days)	NR	2017	USD	per patient	Healthcare expenditure	27,590 (744) *	<0.001

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	MRSA surgical site infection (After PSM)	1,151	2017	USD	per MRSA SSI case	Healthcare expenditure (Attributable excess costs)	33,290 (NR) *	NR
	MRSA surgical site infection (After PSM)	1,279	2017	USD	per MRSA SSI case	Healthcare expenditure (Attributable excess costs)	28,858 (NR) *	NR
	MRSA surgical site infection (After PSM)	1,046	2017	USD	per MRSA SSI case	Healthcare expenditure (Attributable excess costs)	35,693 (NR) *	NR
	MRSA surgical site infection (After PSM)	567	2017	USD	per MRSA SSI case	Healthcare expenditure (Attributable excess costs)	24,252 (NR) *	NR
	MRSA surgical site infection (After PSM)	257	2017	USD	per MRSA SSI case	Healthcare expenditure (Attributable excess costs)	24,667 (NR) *	NR
	MRSA surgical site infection (After PSM)	64	2017	USD	per MRSA SSI case	Healthcare expenditure (Attributable excess costs)	11,630 (NR) *	NR
Naylor 2020 [12]	SA BSI resistant to 1st generation Cephalosporins	1,393	2017	I$	per infection	Excess hospital costs	7,549 t	NR
	SA BSI resistant to Carbapenems	1,362	2017	I$	per infection	Excess hospital costs	7,549 t	NR

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	SA BSI resistant to Gentamicin	1,334	2017	I$	per infection	Excess hospital costs	5,675 [t]	NR
	SA BSI resistant to Fluroquinolones	1,627	2017	I$	per infection	Excess hospital costs	6,392 [t]	NR
	SA BSI resistant to Penicillin's	2,751	2017	I$	per infection	Excess hospital costs	7,108 [t]	NR
	SA BSI resistant to Oxacillin	1,186	2017	I$	per infection	Excess hospital costs	8,155 [t]	NR
Uematsu 2018 [16]	MRSA	7,188	2014 and 2015	USD	per patient	Hospital charges	15,762 (15,698) [*]	<0.001
	MSSA	7,717	2014 and 2015	USD	per patient	Hospital charges	14,152 (14,378) [*]	NA
Asai 2018 [18]	CRE infection	NR[î]	2017	JPY	per patient	Medical expense for admission	220,710 (85,385) [*]	<0.001
	CSE infection	NR[î]	2017	JPY	per patient	Medical expense for admission	69,904 (29,164) [*]	NA
Uematsu 2017 [20]	All patients	7,772,050	2014	USD	per patient	Hospitalization costs	6,362 (10,210) [*] 3,914 (1,954–7,211)	NR
	Anti-MRSA drug group	93,838	2014	USD	per patient	Hospitalization costs	33,548 (46,537) [*] 21,399 (11,435–39,437)	NR
	Control group	2,181,827	2014	USD	per patient	Hospitalization costs	9,979 (12,760) [*] 6,143 (3,468–11,735)	NR
	Non-infection group	5,496,385	2014	USD	per patient	Hospitalization costs	4,626 (5,359) [*] 3,160 (1,594–5,483)	NR

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	Anti-MRSA drug group	93,838	2014	USD	total	Hospitalization costs	3,148,043,318 [t]	NR
	Control group	2,181,827	2014	USD	total	Hospitalization costs	21,358,213,253 [t]	NR
	Non-infection group	5,496,385	2014	USD	total	Hospitalization costs	24,941,817,635 [t]	NR
	Anti-MRSA drug group: Surgical Inpatients	49,787	2014	USD	per patient	Hospitalization costs	41,989 (52,388) [*] 29,596 (16,753–49,789)	NR
	Control group: Surgical Inpatients	1,028,484	2014	USD	per patient	Hospitalization costs	13,401 (14,803) [*] 8,771 (5,246–15,581)	NR
	Anti-MRSA drug group: Non-surgical Inpatients	44,051	2014	USD	per patient	Hospitalization costs	24,007 (36,606) [*] 14,721 (8,049–26,079)	NR
	Control group: Non-surgical Inpatients	1,153,343	2014	USD	per patient	Hospitalization costs	7,020 (9,681) [*] 4,306 (2,606–8,154)	NR
	All inpatients Anti-MRSA drug group	7,772,050	2014	USD	total	Incremental hospitalization costs	1,688,325,549 [t]	NR
	All inpatients Anti-MRSA drug group	7,772,050	2014	USD	total	Incremental hospitalization costs	162,077,310 [t]	NR
	All inpatients Anti-MRSA drug group	9,203,194	2014	USD	total	Incremental hospitalization costs	1,999,213,536 [t]	NR
	Surgical inpatients	3,486,003	2014	USD	total	Incremental hospitalization costs	1,074,390,814 [t]	NR
	Surgical inpatients	3,486,003	2014	USD	total	Incremental hospitalization costs	1,03,543,097 [t]	NR

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	Surgical inpatients	4,127,915	2014	USD	total	Incremental hospitalization costs	1,272,228,960 [t]	NR
	Non-surgical inpatients	4,286,047	2014	USD	total	Incremental hospitalization costs	613,934,735 [t]	NR
	Non-surgical inpatients	4,286,047	2014	USD	total	Incremental hospitalization costs	58,534,213 [t]	NR
	Non-surgical inpatients	5,075,279	2014	USD	total	Incremental hospitalization costs	72,698,4576 [t]	NR
	MRSA surgical inpatients: Other sepsis	3,412	2014	USD	total	Total incremental hospitalization costs	75,441,835 [t]	NR
	MRSA surgical inpatients: Aortic aneurysm and dissection	1,881	2014	USD	total	Total incremental hospitalization costs	61,107,060 [t]	NR
	MRSA surgical inpatients: Disorders of newborn related to short gestation and low birth weight, not elsewhere classified	504	2014	USD	total	Total incremental hospitalization costs	25,849,818 [t]	NR
	MRSA surgical inpatients: Disseminated intravascular coagulation	1,071	2014	USD	total	Total incremental hospitalization costs	25,429,107 [t]	NR
	MRSA surgical inpatients: Atherosclerosis	1,143	2014	USD	total	Total incremental hospitalization costs	21,301,397 [t]	NR
	MRSA surgical inpatients: ST elevation and non-ST elevation myocardial infarction	727	2014	USD	total	Total incremental hospitalization costs	21,246,490 [t]	NR
	MRSA surgical inpatients: Complications of procedures, not elsewhere classified	1,341	2014	USD	total	Total incremental hospitalization costs	21,110,482 [t]	NR

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	MRSA surgical inpatients: Chronic kidney disease	1,030	2014	USD	total	Total incremental hospitalization costs	19,159,299 [t]	NR
	MRSA surgical inpatients: Cardiomyopathy	134	2014	USD	total	Total incremental hospitalization costs	18,820,749 [t]	NR
	MRSA surgical inpatients: Heart failure	625	2014	USD	total	Total incremental hospitalization costs	18,781,211 [t]	NR
	MRSA non-surgical inpatients: Myeloid leukemia	4,180	2014	USD	total	Total incremental hospitalization costs	82,420,907 [t]	NR
	MRSA non-surgical inpatients: Lymphoid leukemia	1,346	2014	USD	total	Total incremental hospitalization costs	51,253,410 [t]	NR
	MRSA non-surgical inpatients: Other sepsis	3,957	2014	USD	total	Total incremental hospitalization costs	43,996,725 [t]	NR
	MRSA non-surgical inpatients: Myelodysplastic syndromes	1,056	2014	USD	total	Total incremental hospitalization costs	30,272,588 [t]	NR
	MRSA non-surgical inpatients: Pneumonitis due to solids and liquids	3,422	2014	USD	total	Total incremental hospitalization costs	26,358,899 [t]	NR
	MRSA non-surgical inpatients: Non-follicular lymphoma	1,336	2014	USD	total	Total incremental hospitalization costs	23,930,328 [t]	NR
	MRSA non-surgical inpatients: Bacterial pneumonia, not elsewhere classified	2,451	2014	USD	total	Total incremental hospitalization costs	21,369,997 [t]	NR
	MRSA non-surgical inpatients: Pneumonia, unspecified organism	1,173	2014	USD	total	Total incremental hospitalization costs	12,537,491 [t]	NR
	MRSA non-surgical inpatients: Heart failure	1,112	2014	USD	total	Total incremental hospitalization costs	12,380,944 [t]	NR
	MRSA non-surgical inpatients:	1,147	2014	USD	total	Total incremental	11,396,522 [t]	NR

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	Disseminated intravascular coagulation					hospitalization costs		
Uematsu 2016 [21]	Anti-MRSA drug group (Unadjusted)	634	2013	USD	per patient	Total antibiotic costs	1,415 (1,919) * 757 (436–1,482)	<0.001
	Control group (Unadjusted)	87,427	2013	USD	per patient	Total antibiotic costs	311 (674) * 152 (77–347)	NA
	Anti-MRSA drug group (Unadjusted)	634	2013	USD	per patient	Total hospitalization costs	12,772 (12,395) * 8,751 (6,007–14,598)	<0.001
	Control group (Unadjusted)	87,427	2013	USD	per patient	Total hospitalization costs	6,124 (6,621) * 4,474 (3,214–6,703)	NA
	Anti-MRSA drug group (PSM)	633	2013	USD	per patient	Total antibiotic costs	1,413 (1,920) * 756 (436–1,476)	<0.001
	Control group (PSM)	633	2013	USD	per patient	Total antibiotic costs	369 (754) * 172 (79–412)	NA
	Anti-MRSA drug group (PSM)	633	2013	USD	per patient	Total hospitalization costs	12,755 (12,397) 8,741 (6,006–14,559)	<0.001
	Control group (PSM)	633	2013	USD	per patient	Total hospitalization costs	7,207 (7,352) * 5,063 (3,372–8,225)	NA
	Anti-MRSA drug group (Unadjusted)	88,061	2013	USD	per patient	Total antibiotic costs	1,104 (121)[!]	<0.001
	Anti-MRSA drug group (PSM)	1,266	2013	USD	per patient	Total antibiotic costs	1,044 (101)[!]	<0.001
	Anti-MRSA drug group (IPTW)	88,061	2013	USD	per patient	Total antibiotic costs	1,056 (85.9)[!]	<0.001
	Anti-MRSA drug group	88,061	2013	USD	per patient	Total hospitalization	6,648 (548)[!]	<0.001

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	(Unadjusted)					costs		
	Anti-MRSA drug group (PSM)	1,266	2013	USD	per patient	Total hospitalization costs	5,548 (580)[!]	<0.001
	Anti-MRSA drug group (IPTW)	88,061	2013	USD	per patient	Total hospitalization costs	5,169 (479)[!]	<0.001
Kashimura 2012 [30]	MRSA SSI	NR	2006	USD	per patient	Cost after surgery	12,477 (NR) [*]	NR
	MRSA SSI	NR	2006	USD	per patient	Cost after surgery (Additional cost)	7,015 (NR) [*] (2,150–11,881[‡])	0.009
Fukatsu 2021 [38]	Clarithromycin-resistant: Non-ASP group	145	2020	JPY	per patient	Drug cost	6,624.7 (6,392.3–6,624.7[^])	<0.001
	Clarithromycin-resistant: ASP group	39	2020	JPY	per patient	Drug cost	6,392.3 (6,392.3–6,392.3[^])	NA
Yuasa 2019 [14]	MRSA infection	365	2014	USD	per patient	Total costs	10,353 (17,690) [*] 5,083 (2,319–11,616)	NR
	MRSA infection	365	2014	USD	per patient	Costs of drugs	5,694 (11,918) [*] 1,695 (576–5,790)	NR
	MRSA infection	365	2014	USD	per patient	Anti-MRSA drugs	849 (239) [*] 394 (156–873)	NR
	MRSA infection	365	2014	USD	per patient	Antifungal drugs	756 (2,338) [*] 0 (0–456)	NR
	MRSA infection	365	2014	USD	per patient	Anticancer drugs	83 (602) [*] 0	NR
	MRSA infection	365	2014	USD	per patient	Immunosuppressants	98 (429) [*] 0	NR

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	MRSA infection	365	2014	USD	per patient	Blood products for transfusion	2,198 (5,485) * 0 (0–1,723)	NR
	MRSA infection	365	2014	USD	per patient	Costs of tests	409 (622) * 219 (88–456)	NR
	MRSA infection	365	2014	USD	per patient	Costs of medical treatments	827 (2,076) * 152 (24–662)	NR
	MRSA infection	365	2014	USD	per patient	Plasmapheresis	20 (286) * 0	NR
	MRSA infection	365	2014	USD	per patient	Total body irradiation	8 (152) * 0	NR
	MRSA infection	365	2014	USD	per patient	HSCT	80 (848) * 0	NR
	MRSA infection	365	2014	USD	per patient	Room costs	2,591 (3,728) * 1,694 (807–3,235)	NR
	MRSA infection	365	2014	USD	per patient	Isolation room fee	855 (3,321) * 0	NR
	MRSA infection	365	2014	USD	per patient	Specific ICU costs	62 (523) * 0	NR
	MRSA infection	365	2014	USD	per patient	High care unit costs	3 (33) * 0	NR
	MRSA infection	365	2014	USD	per patient	Management costs for specific drugs	61 (125) * 0 (0–73)	NR
	MRSA infection	365	2014	USD	per patient	Blood irradiation	11 (47) * 0	NR

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	MRSA bacteremia	120	2014	USD	per patient	Total costs	17,369 (26,991) * 9,099 (4,188–20,178)	NR
	MRSA bacteremia	120	2014	USD	per patient	Costs of drugs	10,827 (17,993) * 5,098 (1,728–12,470)	NR
	MRSA bacteremia	120	2014	USD	per patient	Anti-MRSA drugs	1,077 (1,331) * 528 (307–1,356)	NR
	MRSA bacteremia	120	2014	USD	per patient	Antifungal drugs	1,708 (3,699) * 386 (0–1,938)	NR
	MRSA bacteremia	120	2014	USD	per patient	Anticancer drugs	193 (903) * 0	NR
	MRSA bacteremia	120	2014	USD	per patient	Immunosuppressants	228 (700) * 0 (0–149)	NR
	MRSA bacteremia	120	2014	USD	per patient	Blood products for transfusion	4,733 (7,920) * 2,216 (0–6,009)	NR
	MRSA bacteremia	120	2014	USD	per patient	Costs of tests	563 (744) * 283 (138–660)	NR
	MRSA bacteremia	120	2014	USD	per patient	Costs of medical treatments	1,183 (2,989) * 271 (40–759)	NR
	MRSA bacteremia	120	2014	USD	per patient	Plasmapheresis	61 (498) * 0	NR
	MRSA bacteremia	120	2014	USD	per patient	Total body irradiation	24 (266) * 0	NR
	MRSA bacteremia	120	2014	USD	per patient	HSCT	244 (1,469)	NR

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
							0	
	MRSA bacteremia	120	2014	USD	per patient	Room costs	3,755 (5,728) * 2,356 (1,078–4,691)	NR
	MRSA bacteremia	120	2014	USD	per patient	Isolation room fee	1,988 (5,311) * 0 (0–2,080)	NR
	MRSA bacteremia	120	2014	USD	per patient	Specific ICU costs	126 (746) * 0	NR
	MRSA bacteremia	120	2014	USD	per patient	High care unit costs	0	NR
	MRSA bacteremia	120	2014	USD	per patient	Management costs for specific drugs	104 (182) * 46 (0–91)	NR
	MRSA bacteremia	120	2014	USD	per patient	Blood irradiation	24 (73) * 0 (0–11)	NR
	MRSA pneumonia	88	2014	USD	per patient	Total costs	8,300 (10,936) * 3,676 (1,931–11,360)	NR
	MRSA pneumonia	88	2014	USD	per patient	Costs of drugs	4,678 (8,163) * 1,395 (547–4,820)	NR
	MRSA pneumonia	88	2014	USD	per patient	Anti-MRSA drugs	641 (807) * 320 (137–849)	NR
	MRSA pneumonia	88	2014	USD	per patient	Antifungal drugs	563 (1,316) * 0 (0–293)	NR
	MRSA pneumonia	88	2014	USD	per patient	Anticancer drugs	16 (141) * 0	NR
	MRSA pneumonia	88	2014	USD	per patient	Immunosuppressants	62 (198) *	NR

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
							0	
	MRSA pneumonia	88	2014	USD	per patient	Blood products for transfusion	1,819 (4,636) 0 (0–901)	NR
	MRSA pneumonia	88	2014	USD	per patient	Costs of tests	398 (582) * 202 (96–479)	NR
	MRSA pneumonia	88	2014	USD	per patient	Costs of medical treatments	588 (1,055) * 164 (38–619)	NR
	MRSA pneumonia	88	2014	USD	per patient	Plasmapheresis	0	NR
	MRSA pneumonia	88	2014	USD	per patient	Total body irradiation	0	NR
	MRSA pneumonia	88	2014	USD	per patient	HSCT	0	NR
	MRSA pneumonia	88	2014	USD	per patient	Room costs	2,013 (2,046) * 1148 (663–2,875)	NR
	MRSA pneumonia	88	2014	USD	per patient	Isolation room fee	620 (2,006) *	NR
	MRSA pneumonia	88	2014	USD	per patient	Specific ICU costs	0	NR
	MRSA pneumonia	88	2014	USD	per patient	High care unit costs	5 (47) * 0	NR
	MRSA pneumonia	88	2014	USD	per patient	Management costs for specific drugs	49 (93) * 0 (0–73)	NR
	MRSA pneumonia	88	2014	USD	per patient	Blood irradiation	6 (31) * 0	NR
	MRSA surgical site infections	23	2014	USD	per patient	Total costs	4,247 (4,281) * 2,084 (1,215–5,843)	NR
	MRSA surgical site infections	23	2014	USD	per patient	Costs of drugs	1,310 (1,925) * 512 (242–1,196)	NR

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	MRSA surgical site infections	23	2014	USD	per patient	Anti-MRSA drugs	1,085 (1,860) * 279 (137–933)	NR
	MRSA surgical site infections	23	2014	USD	per patient	Antifungal drugs	0	NR
	MRSA surgical site infections	23	2014	USD	per patient	Anticancer drugs	0	NR
	MRSA surgical site infections	23	2014	USD	per patient	Immunosuppressants	0	NR
	MRSA surgical site infections	23	2014	USD	per patient	Blood products for transfusion	25 (93) * 0	NR
	MRSA surgical site infections	23	2014	USD	per patient	Costs of tests	134 (139) * 85 (25–189)	NR
	MRSA surgical site infections	23	2014	USD	per patient	Costs of medical treatments	392 (910) * 27 (0–199)	NR
	MRSA surgical site infections	23	2014	USD	per patient	Plasmapheresis	0	NR
	MRSA surgical site infections	23	2014	USD	per patient	Total body irradiation	0	NR
	MRSA surgical site infections	23	2014	USD	per patient	HSCT	0	NR
	MRSA surgical site infections	23	2014	USD	per patient	Room costs	1,874 (1,758) * 1,072 (533–3,235)	NR
	MRSA surgical site infections	23	2014	USD	per patient	Isolation room fee	0	NR
	MRSA surgical site infections	23	2014	USD	per patient	Specific ICU costs	0	NR
	MRSA surgical site infections	23	2014	USD	per patient	High care unit costs	0	NR
	MRSA surgical site infections	23	2014	USD	per patient	Management costs for specific drugs	31 (34) * 23 (0–73)	NR
	MRSA surgical site infections	23	2014	USD	per patient	Blood irradiation	1 (5) * 0	NR

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	MRSA other infections	32	2014	USD	per patient	Total costs	4,871 (4,097) * 3701 (1,797–6,109)	NR
	MRSA other infections	32	2014	USD	per patient	Costs of drugs	2,025 (2,707) * 975 (407–2,817)	NR
	MRSA other infections	32	2014	USD	per patient	Anti-MRSA drugs	819 (1,263) * 389 (132–664)	NR
	MRSA other infections	32	2014	USD	per patient	Antifungal drugs	165 (511) * 0	NR
	MRSA other infections	32	2014	USD	per patient	Anticancer drugs	177 (987) * 0	NR
	MRSA other infections	32	2014	USD	per patient	Immunosuppressants	52 (238) * 0	NR
	MRSA other infections	32	2014	USD	per patient	Blood products for transfusion	373 (1,017) * 0	NR
	MRSA other infections	32	2014	USD	per patient	Costs of tests	208 (177) * 169 (78–288)	NR
	MRSA other infections	32	2014	USD	per patient	Costs of medical treatments	492 (1,040) * 106 (13–548)	NR
	MRSA other infections	32	2014	USD	per patient	Plasmapheresis	0	NR
	MRSA other infections	32	2014	USD	per patient	Total body irradiation	0	NR
	MRSA other infections	32	2014	USD	per patient	HSCT	0	NR
	MRSA other infections	32	2014	USD	per patient	Room costs	1,640 (1,245) * 1,389 (872–1,971)	NR
	MRSA other infections	32	2014	USD	per patient	Isolation room fee	212 (730) *	NR

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
							0	
	MRSA other infections	32	2014	USD	per patient	Specific ICU costs	0	NR
	MRSA other infections	32	2014	USD	per patient	High care unit costs	0	NR
	MRSA other infections	32	2014	USD	per patient	Management costs for specific drugs	30 (65) * 0 (0, 59)	NR
	MRSA other infections	32	2014	USD	per patient	Blood irradiation	1 (4) 0	NR
	MRSA unknown infections	102	2014	USD	per patient	Total costs	6,968 (8,096) * 4,712 (8,126–2,224)	NR
	MRSA unknown infections	102	2014	USD	per patient	Costs of drugs	2,671 (4,462) * 1,193 (2638–395)	NR
	MRSA unknown infections	102	2014	USD	per patient	Anti-MRSA drugs	716 (1,230) * 254 (754–151)	NR
	MRSA unknown infections	102	2014	USD	per patient	Antifungal drugs	159 (548) * 0	NR
	MRSA unknown infections	102	2014	USD	per patient	Anticancer drugs	0	NR
	MRSA unknown infections	102	2014	USD	per patient	Immunosuppressants	12 (52) * 0	NR
	MRSA unknown infections	102	2014	USD	per patient	Blood products for transfusion	606 (1,799) * 0 (163–0)	NR
	MRSA unknown infections	102	2014	USD	per patient	Costs of tests	359 (617) * 217 (350–88)	NR
	MRSA unknown infections	102	2014	USD	per patient	Costs of medical treatments	818 (1,801) * 170 (708–19)	NR

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	MRSA unknown infections	102	2014	USD	per patient	Plasmapheresis	0	NR
	MRSA unknown infections	102	2014	USD	per patient	Total body irradiation	0	NR
	MRSA unknown infections	102	2014	USD	per patient	HSCT	0	NR
	MRSA unknown infections	102	2014	USD	per patient	Room costs	2,181 (2,052) * 1,456 (2,918–881)	NR
	MRSA unknown infections	102	2014	USD	per patient	Isolation room fee	122 (689) * 0	NR
	MRSA unknown infections	102	2014	USD	per patient	Specific ICU costs	74 (565) * 0	NR
	MRSA unknown infections	102	2014	USD	per patient	High care unit costs	5 (47) 0	NR
	MRSA unknown infections	102	2014	USD	per patient	Management costs for specific drugs	37 (69) * 0 (73–0)	NR
	MRSA unknown infections	102	2014	USD	per patient	Blood irradiation	2 (15) * 0	NR
Suzuki 2015 [47]	MRSA Patients (In 2006)	NR	NR	JPY	yearly	Gloves (unsterilized)	30,135,600 †	NR
	MRSA Patients (In 2007)	NR	NR	JPY	yearly	Gloves (unsterilized)	37,759,950 †	NR
	MRSA Patients (In 2008)	NR	NR	JPY	yearly	Gloves (unsterilized)	51,611,256 †	NR
	MRSA Patients (In 2009)	NR	NR	JPY	yearly	Gloves (unsterilized)	60,382,800 †	NR
	MRSA Patients (In 2006)	NR	NR	JPY	yearly	Plastic apron (without sleeves)	4,884,050 †	NR
	MRSA Patients (In 2007)	NR	NR	JPY	yearly	Plastic apron (without sleeves)	7,762,875 †	NR
	MRSA Patients (In 2008)	NR	NR	JPY	yearly	Plastic apron (without	13,702,000 †	NR

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
						sleeves)		
	MRSA Patients (In 2009)	NR	NR	JPY	yearly	Plastic apron (without sleeves)	25,352,500 [t]	NR
	MRSA Patients (In 2006)	NR	NR	JPY	yearly	ABRRs	4,588,278 [t]	NR
	MRSA Patients (In 2007)	NR	NR	JPY	yearly	ABRRs	5,739,728 [t]	NR
	MRSA Patients (In 2008)	NR	NR	JPY	yearly	ABRRs	9,658,468 [t]	NR
	MRSA Patients (In 2009)	NR	NR	JPY	yearly	ABRRs	11,928,364 [t]	NR
	MRSA Patients (In 2006)	NR	NR	JPY	yearly	Gloves + apron + rubbing alcohol preparation	39,607,928 [t]	NR
	MRSA Patients (In 2007)	NR	NR	JPY	yearly	Gloves + apron + rubbing alcohol preparation	51,262,553 [t]	NR
	MRSA Patients (In 2008)	NR	NR	JPY	yearly	Gloves + apron + rubbing alcohol preparation	74,971,724 [t]	NR
	MRSA Patients (In 2009)	NR	NR	JPY	yearly	Gloves + apron + rubbing alcohol preparation	97,663,664 [t]	NR
	MRSA Patients (In 2006)	NR	NR	JPY	yearly	Costs of consumables per patient per day (gloves + apron + rubbing alcohol preparation)	207.2 [t]	NR
	MRSA Patients (In 2007)	NR	NR	JPY	yearly	Costs of consumables per patient per day (gloves + apron + rubbing alcohol	272.8 [t]	NR

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
						preparation)		
	MRSA Patients (In 2008)	NR	NR	JPY	yearly	Costs of consumables per patient per day (gloves + apron + rubbing alcohol preparation)	406.4 [t]	NR
	MRSA Patients (In 2009)	NR	NR	JPY	yearly	Costs of consumables per patient per day (gloves + apron + rubbing alcohol preparation)	538.5 [t]	NR
	MRSA Patients (In 2006)	NR	NR	JPY	yearly	Vancomycin 1 vial: 1348 yen	6,986,954 [t]	NR
	MRSA Patients (In 2007)	NR	NR	JPY	yearly	Vancomycin 1 vial: 1348 yen	6,332,432 [t]	NR
	MRSA Patients (In 2008)	NR	NR	JPY	yearly	Vancomycin 1 vial: 1348 yen	6,911,196 [t]	NR
	MRSA Patients (In 2009)	NR	NR	JPY	yearly	Vancomycin 1 vial: 1348 yen	6,428,612 [t]	NR
	MRSA Patients (In 2006)	NR	NR	JPY	yearly	Teicoplanin 1 vial: 5809 yen	12,938,676 [t]	NR
	MRSA Patients (In 2007)	NR	NR	JPY	yearly	Teicoplanin 1 vial: 5809 yen	13,154,481 [t]	NR
	MRSA Patients (In 2008)	NR	NR	JPY	yearly	Teicoplanin 1 vial: 5809 yen	10,955,774 [t]	NR
	MRSA Patients (In 2009)	NR	NR	JPY	yearly	Teicoplanin 1 vial: 5809 yen	11,920,068 [t]	NR
	MRSA Patients (In 2006)	NR	NR	JPY	yearly	Linezolid 1 vial:	4,539,571 [t]	NR

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
						17779 yen		
	MRSA Patients (In 2007)	NR	NR	JPY	yearly	Linezolid 1 vial: 17779 yen	14,389,137 [t]	NR
	MRSA Patients (In 2008)	NR	NR	JPY	yearly	Linezolid 1 vial: 17779 yen	4,604,761 [t]	NR
	MRSA Patients (In 2009)	NR	NR	JPY	yearly	Linezolid 1 vial: 17779 yen	8,493,028 [t]	NR
	MRSA Patients (In 2006)	NR	NR	JPY	yearly	Arbekacin 1 vial: 5812 yen	1,418,128 [t]	NR
	MRSA Patients (In 2007)	NR	NR	JPY	yearly	Arbekacin 1 vial: 5812 yen	618,978 [t]	NR
	MRSA Patients (In 2008)	NR	NR	JPY	yearly	Arbekacin 1 vial: 5812 yen	1,104,280 [t]	NR
	MRSA Patients (In 2009)	NR	NR	JPY	yearly	Arbekacin 1 vial: 5812 yen	305,130 [t]	NR
	MRSA Patients (In 2006)	NR	NR	JPY	yearly	Vancomycin+Teicoplanin+Linezolid+Arbekacin	25,883,329 [t]	NR
	MRSA Patients (In 2007)	NR	NR	JPY	yearly	Vancomycin+Teicoplanin+Linezolid+Arbekacin	34,495,028 [t]	NR
	MRSA Patients (In 2008)	NR	NR	JPY	yearly	Vancomycin+Teicoplanin+Linezolid+Arbekacin	23,576,011 [t]	NR
	MRSA Patients (In 2009)	NR	NR	JPY	yearly	Vancomycin+Teicoplanin+Linezolid+Arbekacin	27,146,838 [t]	NR

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	MRSA Patients (In 2006)	NR	NR	JPY	yearly	NR	67,426,044 [t]	NR
	MRSA Patients (In 2007)	NR	NR	JPY	yearly	NR	48,308,022 [t]	NR
	MRSA Patients (In 2008)	NR	NR	JPY	yearly	NR	28,922,740 [t]	NR
	MRSA Patients (In 2009)	NR	NR	JPY	yearly	NR	27,395,648 [t]	NR
Uryu 2012 [56]	*Streptococcus Pneumoniae*-Group A: Itemized-payment period [2004/10~2006/05]	124	2004-2010	JPY	per patient	Healthcare costs	376,110 (79,790–4,807,780[^])	0.9469
	Streptococcus Pneumoniae-Group B: pre DPC revision period [2006/06~2008/03]	112	2006-2008	JPY	per patient	Healthcare costs	348,280 (79,440–5,149,040[^])	0.9469
	Streptococcus Pneumoniae-Group C: post DPC revision period [2008/04~2010/03]	113	2008-2010	JPY	per patient	Healthcare costs	354,350 (76,680–3,298,460[^])	0.9469
	Streptococcus Pneumoniae-Group B: pre-revision period [2006/06~2008/03]	112	2006-2008	JPY	per patient	Healthcare costs	360,280 (80,590–5,114,510[^])	0.5218
	Streptococcus Pneumoniae-Group C: post-revision period [2008/04~2010/03]	113	2008-2010	JPY	per patient	Healthcare costs	389,630 (78,990–4,428,130[^])	0.5218
	Streptococcus Pneumoniae-Group A: itemized-payment period [2004/10~2006/05]	124	2004-2006	JPY	per patient	Healthcare costs	376,110 (79,790–4,807,780[^])	0.9777
	Streptococcus Pneumoniae-Group B: pre DPC revision period [2006/06~2008/03]	112	2006-2008	JPY	per patient	Healthcare costs	360,280 (80,590–5,114,510[^])	0.9777
	Streptococcus Pneumoniae-Group C: post DPC revision period	113	2008-2010	JPY	per patient	Healthcare costs	389,630 (78,990–4,428,130[^])	0.9777

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	[2008/04~2010/03]							
	Streptococcus Pneumoniae-Group A: itemized-payment period [2004/10~2006/05]	124	2004-2006	JPY	per patient	Medication costs	11,950 (0–233,910^)	0.0003
	Streptococcus Pneumoniae-Group B: pre DPC revision period [2006/06~2008/03]	112	2006-2008	JPY	per patient	Medication costs	7,610 (0–68,220^)	0.0003
	Streptococcus Pneumoniae-Group C: post DPC revision period [2008/04~2010/03]	113	2008-2010	JPY	per patient	Medication costs	7,570 (0–124,514^)	0.0003
	Streptococcus Pneumoniae-Group A: itemized-payment period [2004/10~2006/05]	124	2004-2006	JPY	per patient	Medication costs	873.6 (0–11,205.6^)	0.0240
	Streptococcus Pneumoniae-Group B: pre DPC revision period [2006/06~2008/03]	112	2006-2008	JPY	per patient	Medication costs	369.9 (0–9,562. 8^)	0.0240
	Streptococcus Pneumoniae-Group C: post DPC revision period [2008/04~2010/03]	113	2008-2010	JPY	per patient	Medication costs	317.1 (0–6,079.5^)	0.0240
	Penicillin-resistant *Streptococcus Pneumoniae*-Group A	6	2004-2006	JPY	per patient	Healthcare costs	869,265 (180,850–4,807,780^)	0.0634
	Penicillin-resistant *Streptococcus Pneumoniae*-Group B	2	2006-2008	JPY	per patient	Healthcare costs	545,150 (324,490–765,810^)	0.6535
	Penicillin-resistant *Streptococcus Pneumoniae*-Group C	11	2008-2010	JPY	per patient	Healthcare costs	351,240 (154,450–2,616,140^)	0.7107
	Penicillin-resistant *Streptococcus Pneumoniae*-Group B	2	2006-2008	JPY	per patient	Healthcare costs	581,265 (329,220–833,310^)	0.5862
	Penicillin-resistant *Streptococcus*	11	2008-	JPY	per patient	Healthcare costs	424,000 (140,740–	0.5388

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	Pneumoniae-Group C		2010				2,654,960^)	
	Penicillin-resistant *Streptococcus Pneumoniae*-Group A	6	2004-2006	JPY	per patient	Medication costs	10,848 (4,288–101,451^)	0.2024
	Penicillin-resistant *Streptococcus Pneumoniae*-Group B	2	2006-2008	JPY	per patient	Medication costs	7,466 (7,344–7,588^)	0.1882
	Penicillin-resistant *Streptococcus Pneumoniae*-Group C	11	2008-2010	JPY	per patient	Medication costs	11,782 (6,174–55,146^)	0.0283
	Penicillin-resistant *Streptococcus Pneumoniae*-Group A	6	2004-2006	JPY	per patient	Medication costs	117 (0–4,002^)	0.3763
	Penicillin-resistant *Streptococcus Pneumoniae*-Group B	2	2006-2008	JPY	per patient	Medication costs	1,379.25 (0–2,758.5^)	0.9712
	Penicillin-resistant *Streptococcus Pneumoniae*-Group C	11	2008-2010	JPY	per patient	Medication costs	729.6 (0–4,863.6^)	0.9865
	Penicillin-intermediate *Streptococcus Pneumoniae*-Group A	53	2004-2006	JPY	per patient	Healthcare costs	439,210 (79,790–4,202,190^)	0.0634
	Penicillin-intermediate *Streptococcus Pneumoniae*-Group B	40	2006-2008	JPY	per patient	Healthcare costs	477,775 (79,440–5,149,040^)	0.6535
	Penicillin-intermediate *Streptococcus Pneumoniae*-Group C	48	2008-2010	JPY	per patient	Healthcare costs	356,075 (76,680–3,298,460^)	0.7107
	Penicillin-intermediate *Streptococcus Pneumoniae*-Group B	40	2006-2008	JPY	per patient	Healthcare costs	432,475 (108,810–5,114,510^)	0.5862
	Penicillin-intermediate *Streptococcus Pneumoniae*-Group C	48	2008-2010	JPY	per patient	Healthcare costs	391,710 (92,650–4,428,130^)	0.5388

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	bb	53	2004-2006	JPY	per patient	Medication costs	13,040 (0–233,910^)	0.2024
	Penicillin-intermediate *Streptococcus Pneumoniae*-Group B	40	2006-2008	JPY	per patient	Medication costs	9,971 (0–68,220^)	0.1882
	Penicillin-intermediate *Streptococcus Pneumoniae*-Group C	48	2008-2010	JPY	per patient	Medication costs	7,754 (0–57,528^)	0.0283
	Penicillin-intermediate *Streptococcus Pneumoniae*-Group A	53	2004-2006	JPY	per patient	Medication costs	1,600.8 (0–6,688.5^)	0.3763
	Penicillin-intermediate *Streptococcus Pneumoniae*-Group B	40	2006-2008	JPY	per patient	Medication costs	397.8 (0–5,149.2^)	0.9712
	Penicillin-intermediate *Streptococcus Pneumoniae*-Group C	48	2008-2010	JPY	per patient	Medication costs	226.5 (0–5,072.6^)	0.9865
	Penicillin-susceptible *Streptococcus Pneumoniae*-Group A	65	2004-2006	JPY	per patient	Healthcare costs	319,620 (137,460–4,646,620^)	0.0634
	Penicillin-susceptible *Streptococcus Pneumoniae*-Group B	70	2006-2008	JPY	per patient	Healthcare costs	339,290 (106,790–2,268,270^)	0.6535
	Penicillin-susceptible *Streptococcus Pneumoniae*-Group C	52	2008-2010	JPY	per patient	Healthcare costs	362,775 (122,410–2,035,160^)	0.7107
	Penicillin-susceptible *Streptococcus Pneumoniae* Group	70	2006-2008	JPY	per patient	Healthcare costs	334,680 (80,590–2,778,470^)	0.5862

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	B							
	Penicillin-susceptible *Streptococcus Pneumoniae* Group C	52	2008-2010	JPY	per patient	Healthcare costs	379,210 (78,990–2,069,590^)	0.5388
	Penicillin-susceptible *Streptococcus Pneumoniae*-Group A	65	2004-2006	JPY	per patient	Medication costs	10,680 (2,400–216,834^)	0.2024
	Penicillin-susceptible *Streptococcus Pneumoniae* - Group B	70	2006-2008	JPY	per patient	Medication costs	6,744 (0–48,810^)	0.1882
	Penicillin-susceptible *Streptococcus Pneumoniae*-Group C	52	2008-2010	JPY	per patient	Medication costs	6,115 (1,248–124,514^)	0.0283
	Penicillin-susceptible *Streptococcus Pneumoniae*-Group A	65	2004-2006	JPY	per patient	Medication costs	873.6 (0–11,205.6^)	0.3763
	Penicillin-susceptible *Streptococcus Pneumoniae*-Group B	70	2006-2008	JPY	per patient	Medication costs	369.9 (0–9,562.8^)	0.9712
	Penicillin-susceptible *Streptococcus Pneumoniae*-Group C	52	2008-2010	JPY	per patient	Medication costs	317.1 (0–6,079.5^)	0.9865
	Streptococcus Pneumoniae-Group A: No comorbidity	35	2004-2006	JPY	per patient	Healthcare costs	248,190 (79,790–1,966,840^)	0.6944
	Streptococcus Pneumoniae-Group B: No comorbidity	16	2006-2008	JPY	per patient	Healthcare costs	190,410 (81,280–674,090^)	0.6944
	Streptococcus Pneumoniae-Group C: No comorbidity	34	2008-2010	JPY	per patient	Healthcare costs	238,635 (92,650–1,934,020^)	0.6944

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	Streptococcus Pneumoniae - Group A: With comorbidity	78	2004-2006	JPY	per patient	Healthcare costs	428,230 (110,720–4,807,780^)	0.0553
	Streptococcus Pneumoniae - Group B: With comorbidity	65	2006-2008	JPY	per patient	Healthcare costs	335,520 (80,590–5,114,510^)	0.0553
	Streptococcus Pneumoniae - Group C: With comorbidity	58	2008-2010	JPY	per patient	Healthcare costs	456,890 (166,580–4,428,130^)	0.0553
	Streptococcus Pneumoniae - Group A: Change in disease name	11	2004-2006	JPY	per patient	Healthcare costs	1,024,150 (112,940–4,646,620^)	0.4256
	Streptococcus Pneumoniae - Group B: Change in disease name	31	2006-2008	JPY	per patient	Healthcare costs	970,910 (142,690–2,752,090^)	0.4256
	Streptococcus Pneumoniae - Group C: Change in disease name	21	2008-2010	JPY	per patient	Healthcare costs	624,230 (78,990–2,305,920^)	0.4256
	Streptococcus Pneumoniae - Group B: No collateral injury	16	2006-2008	JPY	per patient	Healthcare costs	230,850 (79,440–774,230^)	0.0158
	Streptococcus Pneumoniae - Group C: No collateral injury	34	2008-2010	JPY	per patient	Healthcare costs	267,575 (76,680–1,969,390^)	<0.0001
	Streptococcus Pneumoniae - Group B: No collateral injury	16	2006-2008	JPY	per patient	Healthcare costs	190,410 (81,280–674,090^)	0.0158
	Streptococcus Pneumoniae - Group C: No collateral injury	34	2008-2010	JPY	per patient	Healthcare costs	238,635 (92,650–1,934,020^)	<0.0001
	Streptococcus Pneumoniae - Group B: with collateral injury	65	2006-2008	JPY	per patient	Healthcare costs	337,040 (115,990–5,149,040^)	0.2629
	Streptococcus Pneumoniae - Group C: with collateral injury	58	2008-2010	JPY	per patient	Healthcare costs	424,760 (207,010–3,298,460^)	0.0299
	Streptococcus Pneumoniae - Group B: with collateral injury	65	2006-2008	JPY	per patient	Healthcare costs	335,520 (80,590–5,114,510^)	0.2629

First author, year [Reference]	Group	N	Cost year	Currency	Cost unit	Type of costs	Median (IQR)	p-value
	Streptococcus Pneumoniae - Group C: with collateral injury	58	2008-2010	JPY	per patient	Healthcare costs	456,890 (116,580–4,428,130^)	0.0299
	Streptococcus Pneumoniae - Group B: Change in disease name	31	2006-2008	JPY	per patient	Healthcare costs	721,430 (186,060–2,268,270^)	0.0182
	Streptococcus Pneumoniae - Group C: Change in disease name	21	2008-2010	JPY	per patient	Healthcare costs	592,510 (122,410–2,035,160^)	0.0793
	Streptococcus Pneumoniae - Group B: Change in disease name	31	2006-2008	JPY	per patient	Healthcare costs	970,910 (142,690–2,752,090^)	0.0182
	Streptococcus Pneumoniae - Group C: Change in disease name	21	2008-2010	JPY	per patient	Healthcare costs	624,230 (78,990–2,305,920^)	0.0793
Obara 2015 [46]	PRSP infection (All)	52	NR	JPY	per patient	Hospitalization costs	102,839 (–15,061–220,740ǂ)	NR
	PRSP infection (Age 5 to 65 years)	13	NR	JPY	per patient	Hospitalization costs	97,193 (–277,181–471,567ǂ)	NR
	PRSP infection (≥65 years)	12	NR	JPY	per patient	Hospitalization costs	94,492 (–276,221–465,206ǂ)	NR

ǂOnly patients admitted to hospital were evaluated, ¹mean (SE), *mean (SD), ^median (range), ᵏ95% CI, ᵗtotal.
Abbreviations: ABRRs, Alcohol-based hand rubs; AMP, Amputation; AMR, Antimicrobial resistance; ASP, Antimicrobial stewardship program;, BSI, Bloodstream infections; CRE, Carbapenem-resistant *Enterobacteriaceae*; CSE, Carbapenem-sensitive *Enterobacteriaceae*; FUSN, Spinal fusion; FX, Open reduction of fracture; HPRO, Hip prosthesis; HSCT, Hematopoietic stem cell transplantation; I$, International dollars; ICU, Intensive care unit; IPTW, Inverse probability treatment weighting; IQR, Interquartile range; JPY, Japanese yen; KPRO, Knee prosthesis; LAM, Laminectomy; MRSA, Methicillin-resistant *Staphylococcus aureus*; MSSA:, Methicillin-susceptible *Staphylococcus aureus*; NA, Not applicable; NR, Not reported; PSM, Propensity score matching; SA, *Staphylococcus aureus*; SSI, Surgical site infection; USD, United States dollars.

Supplementary Table 10: Dose of antibiotics

First author, year [Reference]	Name of antibiotics	Group	N	Amount of antibiotics (mg/kg/d) median (IQR)	p-value
Shoji 2015 [23]	Vancomycin	MRSA bacteremia vancomycin low MIC group: <1.5 μg/mL	116	26.1 (20.9–31.5)	0.969
		MRSA bacteremia vancomycin high MIC group: ≥1.5 μg/mL	24	25 (17.9–38.6)	NA
Mizokami 2013 [35]	Vancomycin	MRSA pneumonia: Severe hypoalbuminemia	23	19.5 (1.6) *	0.658
		MRSA pneumonia: Non severe hypoalbuminemia	71	20.4 (1.2) *	NA
		MRSA pneumonia: Survivors	62	20.9 (10.6) *	0.119
		MRSA pneumonia: Non survivors	32	18.8 (6.6) *	NA
Suzuki 2015 [47]	Vancomycin	MRSA Patients (In 2006)	NR	2,591.6 (NR) *˙	NR
	Vancomycin	MRSA Patients (In 2007)	NR	2,348.8 (NR) *˙	NR
	Vancomycin	MRSA Patients (In 2008)	NR	2,563.5 (NR) *˙	NR
	Vancomycin	MRSA Patients (In 2009)	NR	2,384.5 (NR) *˙	NR
	Teicoplanin	MRSA Patients (In 2006)	NR	445.5 (NR) *˙	NR
	Teicoplanin	MRSA Patients (In 2007)	NR	452.9 (NR) *˙	NR
	Teicoplanin	MRSA Patients (In 2008)	NR	377.2 (NR) *˙	NR
	Teicoplanin	MRSA Patients (In 2009)	NR	410.4 (NR) *˙	NR
	Linezolid	MRSA Patients (In 2006)	NR	153.2 (NR) *˙	NR
	Linezolid	MRSA Patients (In 2007)	NR	485.6 (NR) *˙	NR
	Linezolid	MRSA Patients (In 2008)	NR	155.4 (NR) *˙	NR
	Linezolid	MRSA Patients (In 2009)	NR	286.6 (NR) *˙	NR
	Arbekacin	MRSA Patients (In 2006)	NR	48.8 (NR) *˙	NR
	Arbekacin	MRSA Patients (In 2007)	NR	21.3 (NR) *˙	NR
	Arbekacin	MRSA Patients (In 2008)	NR	38.0 (NR) *˙	NR
	Arbekacin	MRSA Patients (In 2009)	NR	10.5 (NR) *˙	NR
Ogasawara 2012 [42]	Meropenem	Resistance group	20	1ʺ (0.5–3^)	NR
		Non-Resistance group	13	1.5ʺ (1–2^)	NR

*Mean and SE, ˙dose reported in grams (annual usage), ʺunknown measure, ^range.

First author, year [Reference]	Name of antibiotics	Group	N	Amount of antibiotics (mg/kg/d) median (IQR)	p-value
Abbreviations: IQR, Interquartile range; MIC, Minimum inhibitory concentration; MRSA, Methicillin-resistant *Staphylococcus aureus*; NA, Not applicable; NR, Not reported; SE, Standard error.					

Supplementary Table 11: Duration of antibiotics

First author, year [Reference]	Group	Subgroup	N	Duration of antibiotics (days) Median (IQR)	p-value
Sakamoto 2021 [3]	MRSA pneumonia	NA	3,102	24 (15–45)	NR
	Non-MRSA pneumonia	NA	12,320	9 (6–13)	NR
Mitsuboshi 2020 [9]	ESBL-producing Bacteremia (before PSM)	age 65-84 years	110	12 (2–39^)	0.16
	ESBL-producing Bacteremia (before PSM)	age ≥85 years	69	10 (2–42^)	NA
	ESBL-producing Bacteremia (after PSM)	age 65-84 years	65	12 (3–29^)	0.10
	ESBL-producing Bacteremia (after PSM)	age ≥85 years	65	10 (2–42^)	NA
	ESBL-producing Bacteremia	Dead	155	11 (2–42^)	0.07
	ESBL-producing Bacteremia	Survived	24	9 (2–28^)	NA
Yuasa 2019 [14]	MRSA bacteremia	NA	120	10 (7–18) 15.5 (15.3) *	NR
	MRSA pneumonia	NA	88	10 (6–16.5) 12.5 (9.1) *	NR
	MRSA surgical site infection	NA	23	6 (4–16) 10.6 (8.6) *	NR
	MRSA others	NA	32	9 (5–13) 10 (6.8) *	NR
	MRSA unknown	NA	102	9 (6–16) 12.9 (10.7) *	NR

First author, year [Reference]	Group	Subgroup	N	Duration of antibiotics (days) Median (IQR)	p-value
	MRSA bacteremia	Deceased patients	14	12.5 (10–29) 17.8 (12.4) *	NR
	MRSA pneumonia	Deceased patients	15	13 (10–23) 15.9 (9.7) *	NR
	MRSA others	Deceased patients	3	10 (9–11) 10 (1) *	NR
	MRSA unknown	Deceased patients	8	11 (8.5–15.5) 12.4 (5.1) *	NR
Shoji 2015 [23]	MRSA bacteremia	Vancomycin Low MIC: <1.5 μg/ml	116	11.5 (0–17)	0.878
	MRSA bacteremia	Vancomycin High MIC: ≥1.5 μg/mL	24	10 (2.3–17.8)	NA
Fukushima 2022 [36]	MRSA	Before AST	16	21.5 (0–64^)	0.51
	MRSA	After AST	51	17 (0–75^)	NA
Ueda 2022 [37]	ESBL	Cefmetazole-2-time group	23	10 (8–12.5)	0.315
	ESBL	Cefmetazole-3-time group	23	9 (7–12.5)	NA
Fukatsu 2021 [38]	Clarithromycin-resistant	Non-ASP group	145	7 days: 116 (80.0)’ 14 days: 29 (20.0)’	0.028
	Clarithromycin-resistant	ASP group	39	7 days: 37 (94.9)’ 14 days: 2 (5.1)’	NA
Osumi 2021 [39]	ESBL: After the trend score match-Sensitive group	NA	25	15.9 (NR) NR (12) *	NA
	ESBL: After the trend score match-resistant group	NA	25	11.9 (NR) NR (6) *	0.152
Maeda 2014	Without carbapenem-resistant organisms	NA	230	11 (11.3) *	NR

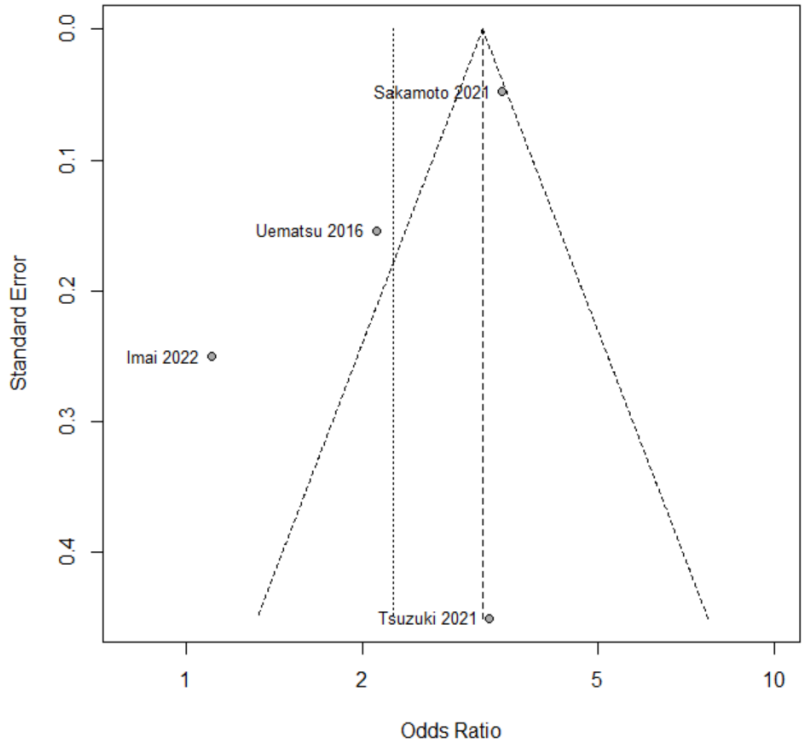
First author, year [Reference]	Group	Subgroup	N	Duration of antibiotics (days) Median (IQR)	p-value
[48]	With carbapenem-resistant organisms	NA	151	14.9 (18.4) *	NR
Goto 2014 [50]	VRE positive	NA	25	1-14 days:12 (48)'' 15 days: 13 (52)''	NR
	VRE negative	NA	135	1-14: 102 (76)'' 15 days: 33 (24)''	NR
Ogasawara 2012 [42]	Resistance to Meropenem	NA	20	9 (2–15^)	N.S
	Non-resistance to Meropenem	NA	13	7 (5–15^)	NA
Uryu 2012 [56]	Group A: itemized-payment period [2004/10~2006/05]	Antimicrobial drip	124	6 (2–32^)	NR
	Group B: pre-revision period [2006/06~2008/03]	Antimicrobial drip	112	6 (6–31^)	NR
	Group C: post-revision period [2008/04~2010/03]	Antimicrobial drip	113	7 (0–31^)	NR
	Group A: itemized-payment period [2004/10~2006/05]	Oral antibacterial drugs	124	5 (0–14^)	NR
	Group B: pre-revision period [2006/06~2008/03]	Oral antibacterial drugs	112	5 (0–14^)	NR
	Group C: post-revision period [2008/04~2010/03]	Oral antibacterial drugs	113	5 (0–10^)	NR
	Penicillin-resistant *Streptococcus Pneumoniae*: Group A	Antimicrobial drip	6	6 (4–18^)	NR
	Penicillin-resistant *Streptococcus Pneumoniae*: Group B	Antimicrobial drip	2	8 (7–9^)	NR
	Penicillin-resistant *Streptococcus Pneumoniae*: Group C	Antimicrobial drip	11	9 (4–31^)	NR
	Penicillin-resistant *Streptococcus Pneumoniae*: Group A	Oral antibacterial drugs	6	2.5 (0–9^)	NR
	Penicillin-resistant *Streptococcus Pneumoniae*: Group B	Oral antibacterial drugs	2	2.5 (0–5^)	NR
	Penicillin-resistant *Streptococcus Pneumoniae*: Group	Oral antibacterial	11	2 (0–10^)	NR

First author, year [Reference]	Group	Subgroup	N	Duration of antibiotics (days) Median (IQR)	p-value
	C	drugs			
	Penicillin-intermediate *Streptococcus Pneumoniae*: Group A	Antimicrobial drip	53	6 (0–32^)	NR
	Penicillin-intermediate *Streptococcus Pneumoniae*: Group B	Antimicrobial drip	40	6.5 (0–24^)	NR
	Penicillin-intermediate *Streptococcus Pneumoniae*: Group C	Antimicrobial drip	48	7 (0–22^)	NR
	Penicillin-intermediate *Streptococcus Pneumoniae*: Group A	Oral antibacterial drugs	53	4 (0–9^)	NR
	Penicillin-intermediate *Streptococcus Pneumoniae*: Group B	Oral antibacterial drugs	40	4.5 (0–13^)	NR
	Penicillin-intermediate *Streptococcus Pneumoniae*: Group C	Oral antibacterial drugs	48	5 (0–10^)	NR
	Penicillin-susceptible *Streptococcus Pneumoniae*: Group A	Antimicrobial drip	65	6 (2–23^)	NR
	Penicillin-susceptible *Streptococcus Pneumoniae*: Group B	Antimicrobial drip	70	5.5 (0–31^)	NR
	Penicillin-susceptible *Streptococcus Pneumoniae*: Group C	Antimicrobial drip	52	5.5 (2–25^)	NR
	Penicillin-susceptible *Streptococcus Pneumoniae*: Group A	Oral antibacterial drugs	65	5 (0–14^)	NR
	Penicillin-susceptible *Streptococcus Pneumoniae*: Group B	Oral antibacterial drugs	70	5 (0–14^)	NR
	Penicillin-susceptible *Streptococcus Pneumoniae*: Group C	Oral antibacterial drugs	52	4.5 (0–10^)	NR

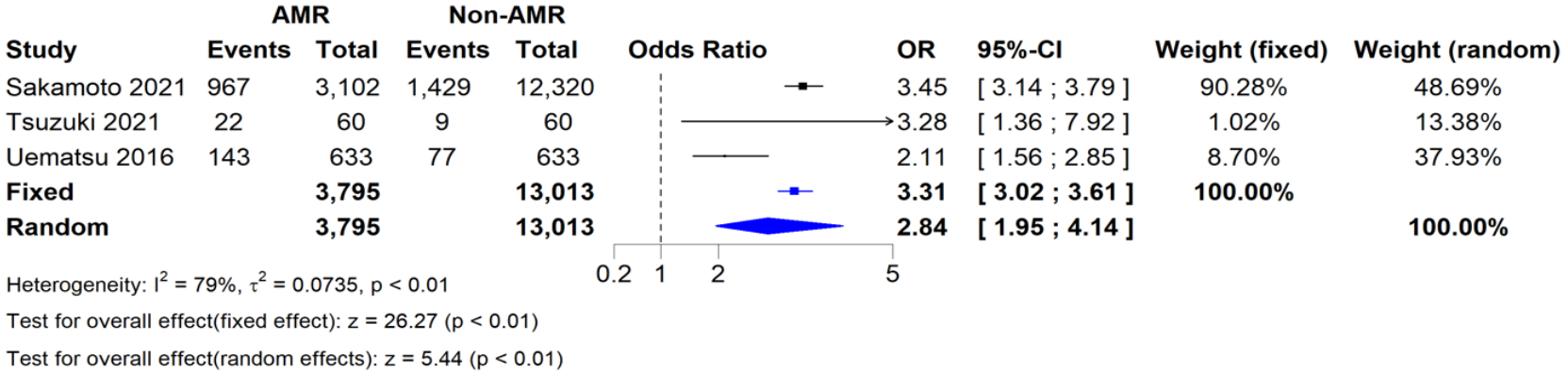
*Mean and SD, ^median and range, ˙number and percentage, ¨number and percentage of patients with the use of broad-spectrum antibacterial drugs (tazobactam, piperacillin, 4th generation cephem antibiotics, new quinolone antibiotics, carbapenem antibiotics).

Abbreviations: ASP: Antimicrobial stewardship program, AST, Antimicrobial stewardship team; ESBL: Extended-spectrum beta-lactamases, IQR: Interquartile range, MIC: Minimum inhibitory concentration, MRSA: Methicillin-resistant *Staphylococcus aureus*, NA: Not applicable, NR: Not reported, NS: Non-significant, PSM: Propensity score matching, SD, Standard deviation; VRE: Vancomycin-resistant *Enterococci*

Supplementary Figure 1: Funnel plot of in-hospital mortality

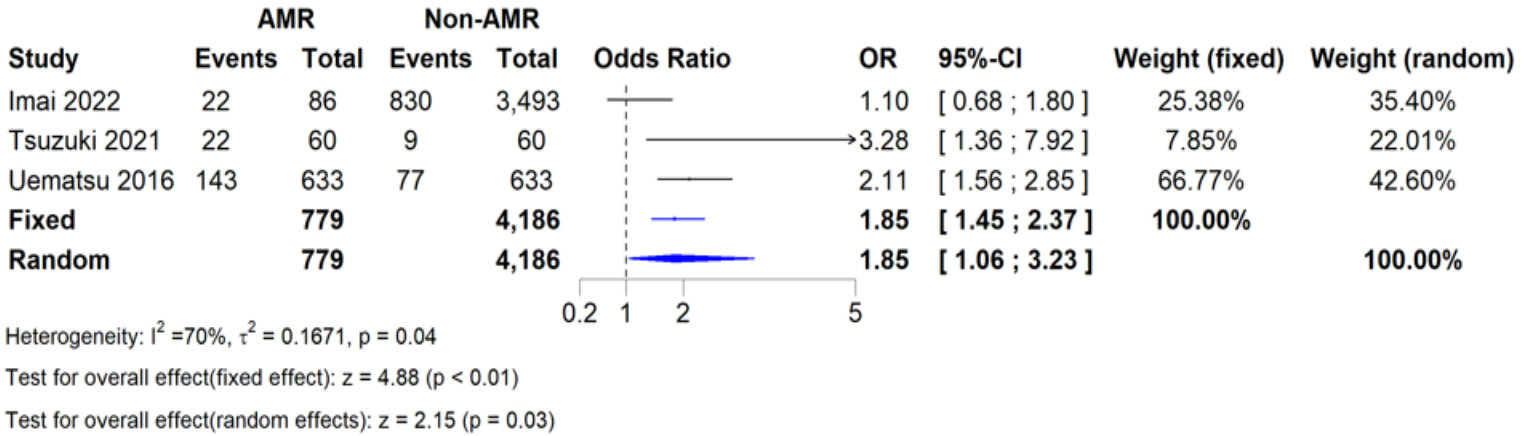


Supplementary Figure 2: Forest plot of in-hospital mortality in the MRSA group (excluding the carbapenem-resistant group)



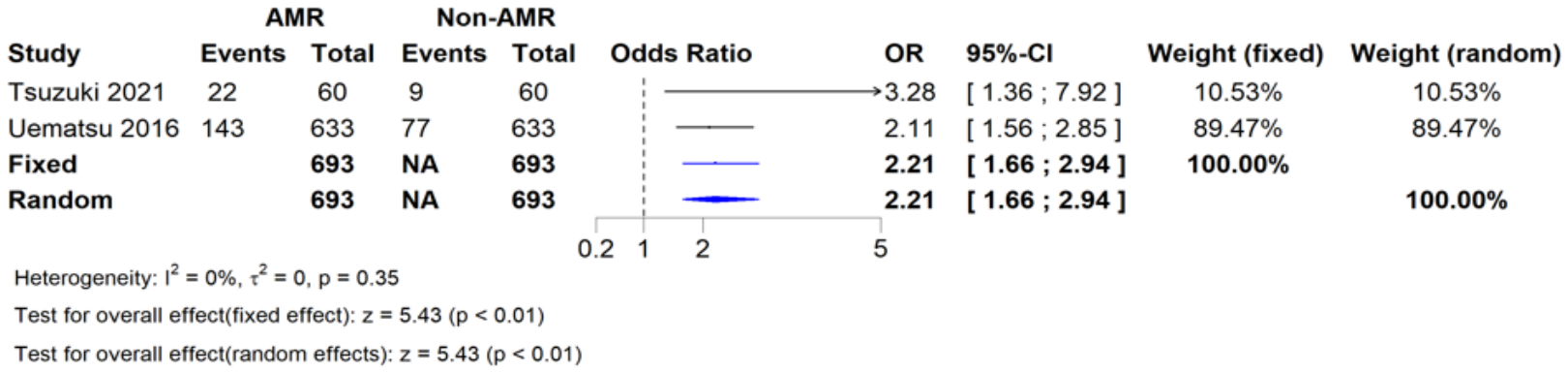
Abbreviations: AMR: antimicrobial resistance; CI: confidence interval; MRSA: Methicillin-resistant *Staphylococcus aureus*; OR: odds ratio

Supplementary Figure 3: Forest plot of in-hospital mortality_excluding Sakamoto 2021



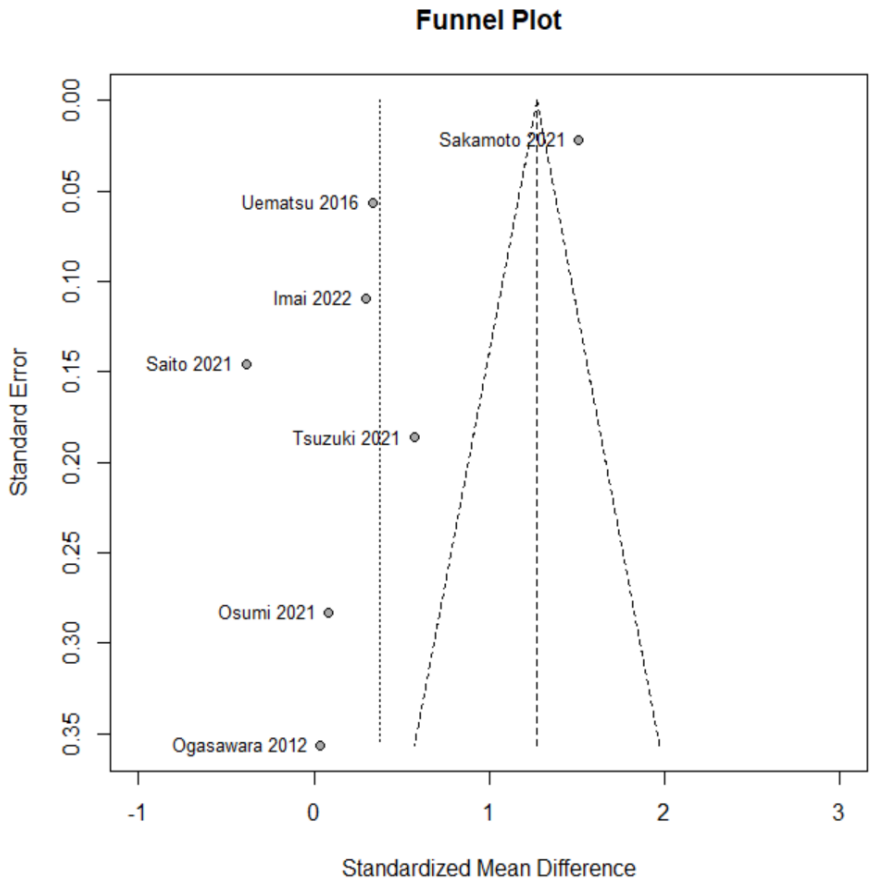
Abbreviations: AMR: antimicrobial resistance; CI: confidence interval; OR: odds ratio

Supplementary Figure 4: Forest plot of in-hospital mortality in the MRSA group (excluding the carbapenem-resistant group)_ excluding Sakamoto 2021

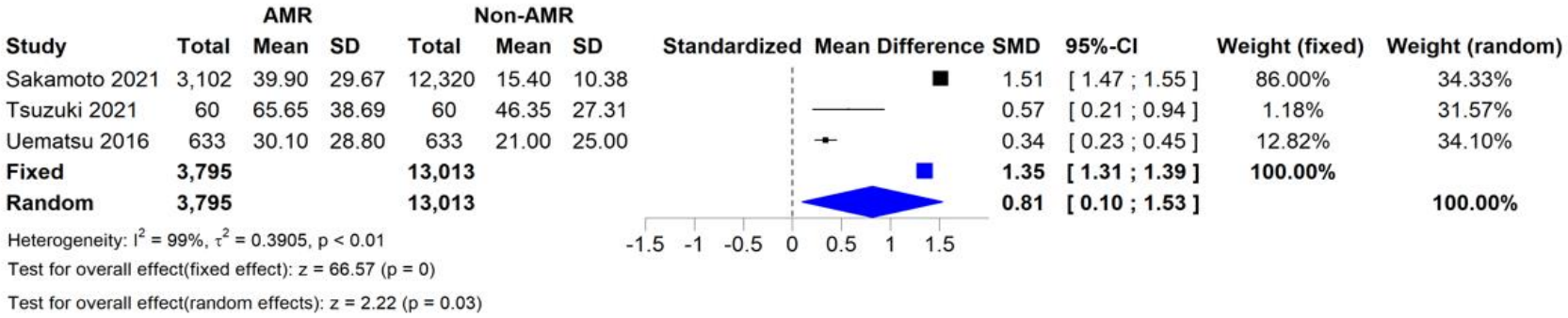


Abbreviations: AMR: antimicrobial resistance; CI: confidence interval; OR: odds ratio

Supplementary Figure 5: Funnel plot of length of stay

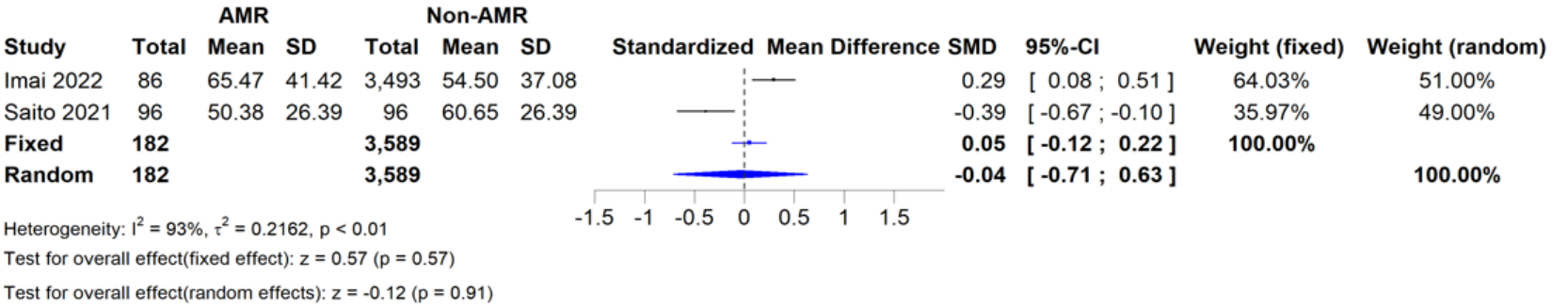


Supplementary Figure 6: Forest plot of length of stay in the MRSA group (excluding carbapenem-resistant, ESBL, meropenem)



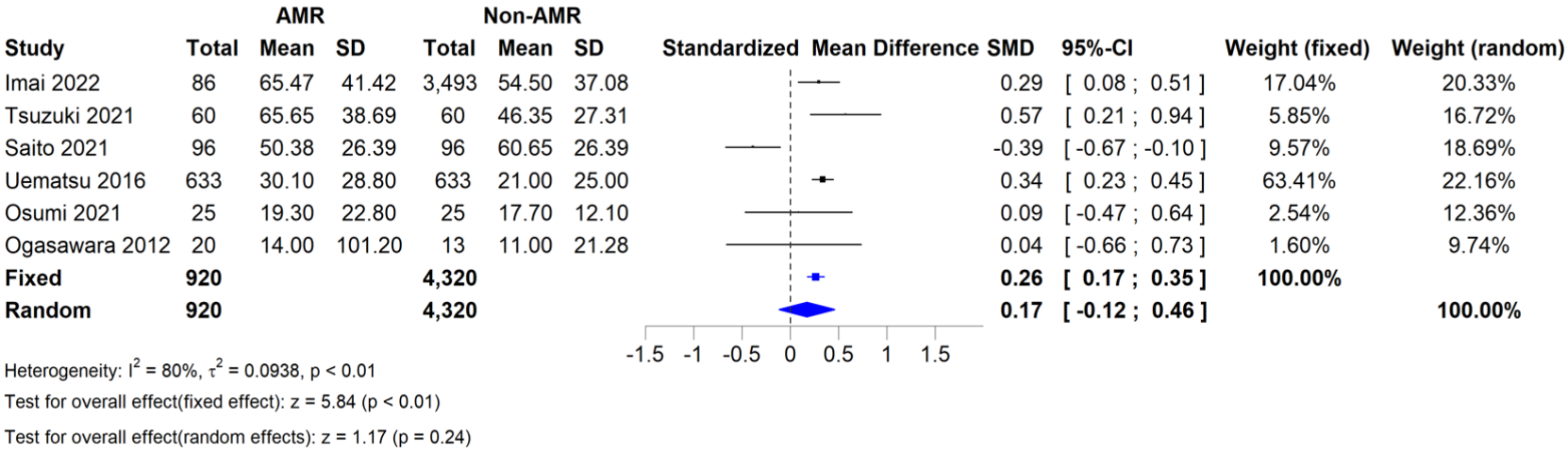
Abbreviations: AMR: antimicrobial resistance; CI: confidence interval; ESBL: Extended-spectrum beta-lactamases; MRSA: Methicillin-resistant *Staphylococcus aureus*; SD: standard deviation; SMD: standardized mean difference

Supplementary Figure 7: Forest plot of length of stay in the carbapenem-resistant group (excluding the MRSA, ESBL, meropenem groups)



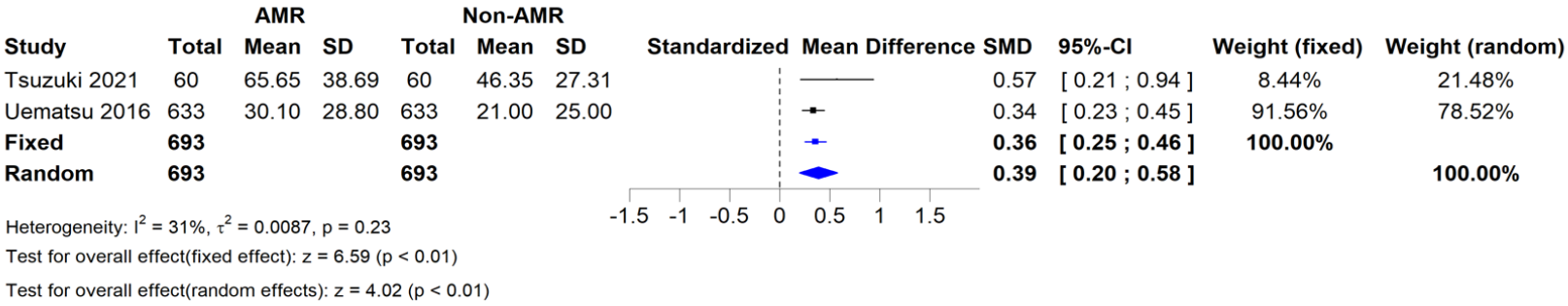
Abbreviations: AMR: antimicrobial resistance; CI: confidence interval; ESBL: Extended-spectrum beta-lactamases; MRSA: Methicillin-resistant *Staphylococcus aureus*; SD: standard deviation; SMD: standardized mean difference

Supplementary Figure 8: Forest plot of length of stay_excluding Sakamoto 2021



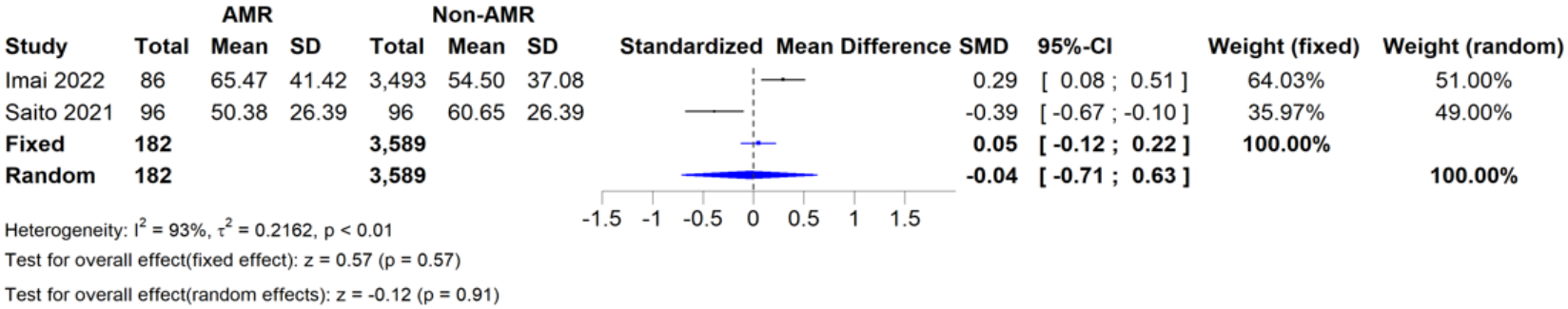
Abbreviations: AMR: antimicrobial resistance; CI: confidence interval; SD: standard deviation; SMD: standardized mean difference

Supplementary Figure 9: Forest plot of length of stay in the MRSA group (excluding carbapenem-resistant, ESBL, meropenem groups) _excluding Sakamoto 2021



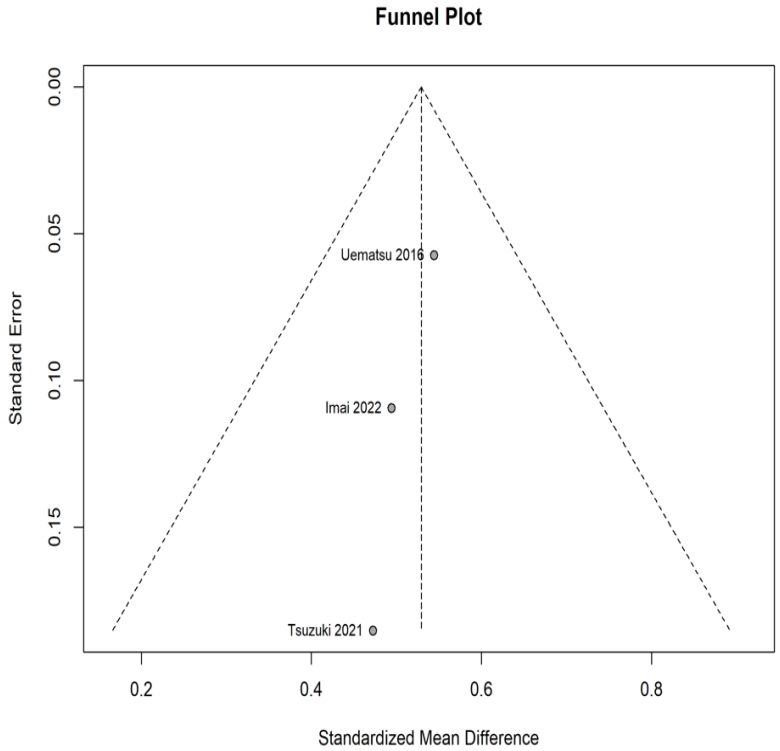
Abbreviations: AMR: antimicrobial resistance; CI: confidence interval; SD: standard deviation; SMD: standardized mean difference

Supplementary Figure 10: Forest plot of length of stay in the carbapenem-resistant group (excluding the MRSA, ESBL, meropenem groups) _excluding Sakamoto 2021



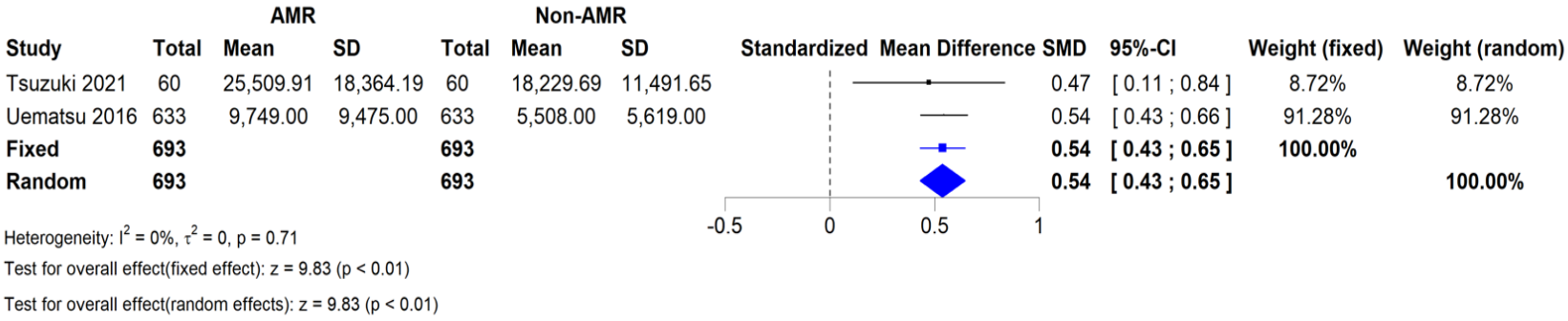
Abbreviations: AMR: antimicrobial resistance; CI: confidence interval; SD: standard deviation; SMD: standardized mean difference

Supplementary Figure 11: Funnel plot of direct medical cost in USD



Abbreviations: USD: United States dollars

Supplementary Figure 12: Direct medical cost in USD - MRSA group sensitivity analysis (excluding carbapenem-resistant group)



Abbreviations: AMR: Antimicrobial resistance; CI: confidence interval; JPY: Japanese yen; MRSA: Methicillin-resistant *Staphylococcus aureus*; SD: Standard deviation; USD: United States dollars

References

1. Shimizu M, Mihara T, Ohara J, Inoue K, Kinoshita M, Sawa T. Relationship between mortality and molecular epidemiology of methicillin-resistant Staphylococcus aureus bacteremia. PLoS One. 2022;17(7):e0271115.
2. Imai S, Inoue N, Nagai H. Economic and clinical burden from carbapenem-resistant bacterial infections and factors contributing: a retrospective study using electronic medical records in Japan. BMC Infect Dis. 2022;22(1):581.
3. Sakamoto Y, Yamauchi Y, Jo T, Michihata N, Hasegawa W, Takeshima H, et al. In-hospital mortality associated with community-acquired pneumonia due to methicillin-resistant Staphylococcus aureus: a matched-pair cohort study. BMC Pulm Med. 2021;21(1):345.
4. Tsuzuki S, Yu J, Matsunaga N, Ohmagari N. Length of stay, hospitalisation costs and in-hospital mortality of methicillin-susceptible and methicillin-resistant Staphylococcus aureus bacteremia in Japan. Public Health. 2021;198:292-6.
5. Kohno J, Kawamura T, Kikuchi A, Akaishi T, Takayama S, Ishii T. A Japanese traditional medicine Hochuekkito promotes negative conversion of vancomycin-resistant Enterococci. Sci Rep. 2021;11(1):11300.
6. Saito S, Hayakawa K, Tsuzuki S, Ishikane M, Nagashima M, Mezaki K, et al. A Matched Case-Case-Control Study of the Impact of Clinical Outcomes and Risk Factors of Patients with IMP-Type Carbapenemase-Producing Carbapenem-Resistant Enterobacteriaceae in Japan. Antimicrob Agents Chemother. 2021;65(3).
7. Umemura Y, Ogura H, Takuma K, Fujishima S, Abe T, Kushimoto S, et al. Current spectrum of causative pathogens in sepsis: A prospective nationwide cohort study in Japan. Int J Infect Dis. 2021;103:343-51.
8. Fukuda H, Sato D, Iwamoto T, Yamada K, Matsushita K. Healthcare resources attributable to methicillin-resistant Staphylococcus aureus orthopedic surgical site infections. Sci Rep. 2020;10(1):17059.
9. Mitsuboshi S, Tsuruma N, Watanabe K, Takahashi S, Ito A, Nakashita M, et al. Advanced Age is not a Risk Factor for Mortality in Patients with Bacteremia Caused by Extended-Spectrum beta-Lactamase-Producing Organisms: a Multicenter Cohort Study. Jpn J Infect Dis. 2020;73(4):288-92.
10. Hayakawa K, Nakano R, Hase R, Shimatani M, Kato H, Hasumi J, et al. Comparison between IMP carbapenemase-producing Enterobacteriaceae and non-carbapenemase-producing Enterobacteriaceae: a multicentre prospective study of the clinical and molecular epidemiology of carbapenem-resistant Enterobacteriaceae. J Antimicrob Chemother. 2020;75(3):697-708.
11. Miyazaki T, Yanagihara K, Kakeya H, Izumikawa K, Mukae H, Shindo Y, et al. Daily practice and prognostic factors for pneumonia caused by methicillin-resistant Staphylococcus aureus in Japan: A multicenter prospective observational cohort study. J Infect Chemother. 2020;26(2):242-51.
12. Naylor NR, Yamashita K, Iwami M, Kunisawa S, Mizuno S, Castro-Sanchez E, et al. Code-Sharing in Cost-of-Illness Calculations: An Application to Antibiotic-Resistant Bloodstream Infections. Front Public Health. 2020;8:562427.
13. Tetsuka N, Hirabayashi A, Matsumoto A, Oka K, Hara Y, Morioka H, et al. Molecular epidemiological analysis and risk factors for acquisition of carbapenemase-producing Enterobacter cloacae complex in a Japanese university hospital. Antimicrob Resist Infect Control. 2019;8:126.
14. Yuasa A, Murata T, Imai K, Yamamoto Y, Fujimoto Y. Treatment procedures and associated medical costs of methicillin-resistant Staphylococcus aureus infection in Japan: A retrospective analysis using a database of Japanese employment-based health insurance. SAGE Open Med. 2019;7:2050312119871181.

15. Hattori H, Maeda M, Nagatomo Y, Takuma T, Niki Y, Naito Y, et al. Epidemiology and risk factors for mortality in bloodstream infections: A single-center retrospective study in Japan. Am J Infect Control. 2018;46(12):e75-e9.
16. Uematsu H, Yamashita K, Mizuno S, Kunisawa S, Shibayama K, Imanaka Y. Effect of methicillin-resistant Staphylococcus aureus in Japan. Am J Infect Control. 2018;46(10):1142-7.
17. Kainuma A, Momiyama K, Kimura T, Akiyama K, Inoue K, Naito Y, et al. An outbreak of fluoroquinolone-resistant Pseudomonas aeruginosa ST357 harboring the exoU gene. J Infect Chemother. 2018;24(8):615-22.
18. Asai N, Sakanashi D, Suematsu H, Kato H, Hagihara M, Nishiyama N, et al. The epidemiology and risk factor of carbapenem-resistant enterobacteriaceae colonization and infections: Case control study in a single institute in Japan. J Infect Chemother. 2018;24(7):505-9.
19. Shime N, Saito N, Bokui M, Sakane N, Kamimura M, Shinohara T, et al. Clinical outcomes after initial treatment of methicillin-resistant Staphylococcus aureus infections. Infect Drug Resist. 2018;11:1073-81.
20. Uematsu H, Yamashita K, Kunisawa S, Fushimi K, Imanaka Y. Estimating the disease burden of methicillin-resistant Staphylococcus aureus in Japan: Retrospective database study of Japanese hospitals. PLoS One. 2017;12(6):e0179767.
21. Uematsu H, Yamashita K, Kunisawa S, Fushimi K, Imanaka Y. The economic burden of methicillin-resistant Staphylococcus aureus in community-onset pneumonia inpatients. Am J Infect Control. 2016;44(12):1628-33.
22. Hamada Y, Magarifuchi H, Oho M, Kusaba K, Nagasawa Z, Fukuoka M, et al. Clinical features of enterococcal bacteremia due to ampicillin-susceptible and ampicillin-resistant enterococci: An eight-year retrospective comparison study. J Infect Chemother. 2015;21(7):527-30.
23. Shoji H, Maeda M, Shirakura T, Takuma T, Ugajin K, Fukuchi K, et al. More accurate measurement of vancomycin minimum inhibitory concentration indicates poor outcomes in meticillin-resistant Staphylococcus aureus bacteraemia. Int J Antimicrob Agents. 2015;46(5):532-7.
24. Seki M, Takahashi H, Yamamoto N, Hamaguchi S, Ojima M, Hirose T, et al. Polymerase chain reaction-based active surveillance of MRSA in emergency department patients. Infect Drug Resist. 2015;8:113-8.
25. Kaku N, Yanagihara K, Morinaga Y, Yamada K, Harada Y, Migiyama Y, et al. Influence of antimicrobial regimen on decreased in-hospital mortality of patients with MRSA bacteremia. J Infect Chemother. 2014;20(6):350-5.
26. Aoyagi T, Kaito C, Sekimizu K, Omae Y, Saito Y, Mao H, et al. Impact of psm-mec in the mobile genetic element on the clinical characteristics and outcome of SCCmec-II methicillin-resistant Staphylococcus aureus bacteraemia in Japan. Clin Microbiol Infect. 2014;20(9):912-9.
27. Nagao M. A multicentre analysis of epidemiology of the nosocomial bloodstream infections in Japanese university hospitals. Clin Microbiol Infect. 2013;19(9):852-8.
28. Shindo Y, Ito R, Kobayashi D, Ando M, Ichikawa M, Shiraki A, et al. Risk factors for drug-resistant pathogens in community-acquired and healthcare-associated pneumonia. Am J Respir Crit Care Med. 2013;188(8):985-95.
29. Isobe M, Uejima E, Seki M, Yamagishi Y, Miyawaki K, Yabuno K, et al. Methicillin-resistant Staphylococcus aureus bacteremia at a university hospital in Japan. J Infect Chemother. 2012;18(6):841-7.
30. Kashimura N, Kusachi S, Konishi T, Shimizu J, Kusunoki M, Oka M, et al. Impact of surgical site infection after colorectal surgery on hospital stay and medical expenditure in Japan. Surg Today. 2012;42(7):639-45.
31. Yamagata A, Ito A, Nakanishi Y, Ishida T. Prognostic factors in nursing and healthcare-associated pneumonia. J Infect Chemother. 2020;26(6):563-9.

32. Yamada K, Imoto W, Yamairi K, Shibata W, Namikawa H, Yoshii N, et al. The intervention by an antimicrobial stewardship team can improve clinical and microbiological outcomes of resistant gram-negative bacteria. J Infect Chemother. 2019;25(12):1001-6.
33. Shoji H, Urakawa T, Watanabe K, Hirano T, Katsumi K, Ohashi M, et al. Clinical features, outcomes, and survival factor in patients with vertebral osteomyelitis infected by methicillin-resistant staphylococci. J Orthop Sci. 2016;21(3):282-6.
34. Hanada S, Iwata S, Kishi K, Morozumi M, Chiba N, Wajima T, et al. Host Factors and Biomarkers Associated with Poor Outcomes in Adults with Invasive Pneumococcal Disease. PLoS One. 2016;11(1):e0147877.
35. Mizokami F, Shibasaki M, Yoshizue Y, Noro T, Mizuno T, Furuta K. Pharmacodynamics of vancomycin in elderly patients aged 75 years or older with methicillin-resistant Staphylococcus aureus hospital-acquired pneumonia. Clin Interv Aging. 2013;8:1015-21.
36. Fukushima M, Maeda A, Soga H, Tomono Y, Machida S, Oi Z, et al. Effects of AST Activity on MRSA Bacteremia Using the Automatic Simultaneous Multi-Item Genetic Testing System (Verigene System) [Japanese] [自動多項目同時遺伝子関連検査システム（Verigene システム）を利用した MRSA 菌血症に対する AST 活動の効果]. Journal of Japanese Society of Hospital Pharmacists. 2022;58(5):545-50.
37. Ueda S, Okada M, Ito T, Kobayashi K, Takahashi T, Marumo S, et al. Comparative Study of the Effects of Different Dosing Frequencies of Cefmetazole on Urinary Tract Infection Caused by Extended-Spectrum β-Lactamase-Producing Escherichia Coli [Japanese] [基質特異性拡張型 β-ラクタマーゼ産生大腸菌に起因する尿路感染症に対するセフメタゾールの投与回数の違いによる有効性の比較検討]. Journal of Japanese Society of Hospital Pharmacists. 2022;58(2):167-72.
38. Fukatsu M, Umemura T, Mizuno T, Ohguchi H, Iwatsu S, Matsumoto S, et al. Positive Impacts of Antimicrobial Stewardship on Intial Eradication Success and Drug Costs of Treatment for Clarithromycin-Reisistant Helicobacter pyloriInfections [Japanese] [薬剤師によるクラリスロマイシン耐性 Helicobacter pylori 感染に対する抗菌薬適正使用支援が初回除菌率と薬剤費に与える影響]. Japanese Journal of Pharmaceutical Health Care and Sciences. 2021;47(11):609-15.
39. Osumi T, Tanaka D, Eguchi T, Imai T, Shimizu H, Sakai M, et al. Retrospective Study of Initiation of Empirical Therapies Out of the Antibacterial Spectrum for Urinary Tract Infections Presumed to Be Caused by Extended Spectrum β-Lactamases Producing Bacteria [Japanese] [ESBL 産生菌が原因と推定される尿路感染症にスペクトラムが外れた経験的治療を開始したことが及ぼす影響の後方視的検討]. Journal of Japanese Society of Hospital Pharmacists. 2021;57(11):1215-20.
40. Kobayashi H, Moriyama Y, Kurosu H. Report Methicillin-resistant Staphylococcus aureus Hospital Infection Surveillance for the Fiscal Year 2011 [Japanese] [報告 2011 年度の Methicillin-resistant Staphylococcus aureus 病院感染症サーベイランス]. Japanese Journal of Infection Prevention and Control. 2013;28(3):178-9.
41. The Japanese Society of Intensive Care Medicine CoSR. 2007 JSICM Sepsis 1st Registry : Management of Severe Sepsis and Septic Shock in Japan. Journal of the Japanese Society of Intensive Care Medicine. 2013;20(2):329-34.
42. Ogasahara Y, Nagasaki N, Ohno K, Harino T, Yoshida T, Maruko M. Factors Causing P.aeruginosa Resistance in Patients Treated with Meropenem [Japanese] [Meropenem 投与患者における緑膿菌耐性化因子の検討]. Japanese Journal of Infection Prevention and Control. 2012;27(6):419-24.
43. Furukawa D, Asai S, Nakgohri T. Trend of methicillin - resistant Staphylococcus aureus isolation in gastroenterological surgery] [Japanese] [消化器外科におけるメチシリン耐性黄色ブドウ球菌検出の動向]. Journal of Japan Society for Surgical Infection. 2012;9(2):143-50.
44. Kawamura I, Sekiya N, Araoka H, Nei T, Harada S, Kurai H, et al. Surveillance of Methicillin-resistant Staphylococcus aureus in 7 Japanese Hospitals, 2015. Japanese Journal of Infection Prevention and Control. 2017;32(3):135-40.

45. Sasaki S, Kuwana Y, Chimori A, Yoshida K. Epidemiological characterization of clinically isolated MRSA in Kinki Central Hospital, mainly for vancomycin MIC [Japanese] [近畿中央病院における MRSA 臨床分離株の疫学調査]. Medical Journal of Kinki Central Hospital. 2015(35):25-32.
46. Obara H, Saitou J, Fukuda H. Increased Burden on Medical Resources of Penicillin-Resistant Streptococcus Pneumoniae Infections: Estimates Using JANIS Data. Japanese Journal of Infection Prevention and Control. 2015;30(3):165-73.
47. Suzuki T, Tsuchiya M, Niwa T, Watanabe T, Ohta H, Fukako A, et al. Cost Effectiveness of Controlling Healthcare-Associated Spread of Methicillin-Resistant Staphylococcus aureus [Japanese] [当院における MRSA 感染制御活動の経済的評価に関する検討]. Japanese Journal of Infection Prevention and Control. 2015;30(2):91-6.
48. Maeda M, Oto Y, Murayama J, Minemura A, Baba T, Yoshida H, et al. A study of risk factors for antibiotic selective pressure in Carbapenem-treated patients [Japanese] [カルバペネム系薬投与患者における耐性菌選択リスク因子の検討]. Journal of the Showa University Society. 2014;74(1):67-72.
49. Kosuge Y, Nagashima G, Enomoto K, Kato A, Noda M, Morishima H, et al. Clinical characteristics of multidrug-resistant bacteria infection with stroke [Japanese] [脳卒中患者における多剤耐性菌感染症の臨床検討]. Neurosurgical Emergency. 2013;18(2):173-6.
50. Goto Y, Hayashi M, Akasaki J, Ito M, Yamamoto K, Sawa A, et al. Study of Risk Factors for Carriage of Vancomycin-resistant Enterococcus [Japanese] [バンコマイシン耐性腸球菌の保菌におけるリスク因子の検討]. Journal of Japanese Society of Hospital Pharmacists. 2014(4):499-502.
51. Nakatsuka Y, Morimoto C, Yasuda I, Tsuji T, Kaji Y, Yasuda T, et al. An Analysis of the Correlation between Guidelines-concordant Treatment and the Treatment Outcome on Nursing and Healthcare-associated pneumonia Patients. Kansenshogaku Zasshi. 2013;87(6):739-45.
52. Hanaoka N, Etoh S, Fujiyoshi N, Hirata T, Omura K. Antimicrobial Therapy for Multi-drug Resistant Pseudomonas aeruginosa (MDRP) Infection in Patients with Severe Burns , Admitted to Chiba Emergency Medical Center [Japanese] [当医療センターでの重症熱傷患者における多剤耐性緑膿菌感染症に対しての抗菌薬療法]. Japanese journal of intensive care medicine. 2013;37(4):311-8.
53. Iwabuchi H, Oguchi K. Actual status of sepsis and countermeasures [Japanese] [4. 敗血症の実態と対策]. Journal of Japanese Society for Dialysis Therapy. 2013;46(2):176-8.
54. Sano T. MRSA infection of department of respiratory medicine [Japanese] [本学における MRSA 感染症の現状 呼吸器内科における MRSA 感染症の現状]. Journal of the Medical Society of Toho University. 2012;59(6):320-2.
55. Suehiro T, Takahashi Y, Okushita Y, Shiraishi A, Ogawa M, Imozuka K, et al. Detection of MRSA and ESBL-Producing Bacteria in Emergency Hospitalized Patients [Japanese] [臨牀指針 緊急入院患者における MRSA および ESBL 産生菌の検出状況について]. The Japanese Journal of Clinical and Experimental Medicine. 2012;89(6):813-5.
56. Uryu K, Nishiura S, Yamamoto T, Umakosi T, Nisida M, Suzuki M, et al. Changes in medical treatment fees for pneumococcal pneumonia in our hospital before and after the introduction of DPC. Journal of Japanese Society for Clinical Pathway. 2012;14(2):113-21.