

	ICU patients, n (%) (This study, n=61)	Inpatients, n (%) (Not ICU, n=48)
Age average, years (SD)	61.0 ± 19.2	69.1 ± 12.3
Male sex, n(%)	39 (0.0)	33 (68.8)
With remaining teeth (SD)	21.3 ± 9.1	18.9 ± 9.6
Decayed, Missing, Filled (DMF) index (SD)	13.9 ± 9.9	N.D.
Obvious diseases of the tongue and oral mucosa		
Yes	11 (18.0)	10 (20.8)
Chief complaint on admission		
Cardiovascular	17 (27.9)	N.D.
Respiratory	9 (14.8)	N.D.
Gastroenterology, Hepatology and Pancreatology	6 (9.8)	N.D.
Infectious Diseases	14 (23.0)	N.D.
Endocrine and Metabolic Disorders	4 (6.6)	N.D.
Malignant Tumours	11 (18.0)	N.D.
Neurological Disorders	11 (18.0)	N.D.
Trauma	4 (6.6)	N.D.
Other	2 (3.3)	N.D.
Presence of comorbidities		
Hypertension	23 (37.7)	24 (50.0)
Diabetes	17 (27.9)	12 (25.0)
Cirrhosis and Liver Disease	7 (11.5)	9 (18.8)
Malignant Tumours	9 (14.8)	30 (62.5)
Cardiovascular Disease	5 (8.2)	9 (18.8)
Renal Failure	4 (6.6)	5 (10.4)
Cerebral Infarction	4 (6.6)	2 (4.2)
Dyslipidaemia	6 (9.8)	11 (22.9)

Table. S1 Characteristics of medical information obtained from participants in this study.

	<i>S. aureus</i> (n, %)			MSSA (n, %)			MRSA (n, %)		
Participants with GNARB ^a	Positive	Negative	<i>p</i> value	Positive	Negative	<i>p</i> value	Positive	Negative	<i>p</i> value
Positive (n=11)	8 (22.9)	3 (11.6)	0.3254	6 (21.43)	5 (15.2)	0.7396	2 (28.6)	9 (16.7)	0.5993
Negative (n=50)	27 (77.1)	23 (88.5)		22 (78.57)	28 (84.9)		5 (71.4)	45 (83.3)	

GNARB^a: Gram-negative drug-resistant bacteria

Table. S2 Relationship between Gram-negative drug-resistant bacteria and *S. aureus* (MSSA, MRSA) carriage.

	Gram-negative Antibiotic-resistant bacteria			<i>S. aureus</i> (MSSA and MRSA)			MRSA		
	Negative (n=50)	Positive (n=11)	<i>p</i> -value	Negative (n=26)	Positive (n=35)	<i>p</i> -value	Negative (n=51)	Positive (n=10)	<i>p</i> -value
Chief complaint on admission									
Cardiovascular	13 (26.0)	4 (36.4)	0.48	8 (30.8)	9 (25.7)	0.78	14 (27.5)	3 (30.0)	1.00
Respiratory	8 (16.0)	1 (9.1)	1.00	5 (19.2)	4 (11.4)	0.48	8 (15.7)	1 (10.0)	1.00
Gastroenterology, Hepatology and Pancreatology	5 (10.0)	1 (9.1)	1.00	4 (15.4)	2 (5.71)	0.39	5 (9.8)	1 (10.0)	1.00
Infectious Diseases	13 (26.0)	1 (9.1)	0.43	6 (23.1)	8 (22.9)	1.00	13 (25.5)	1 (10.0)	0.43
Endocrine and Metabolic Disorders	3 (6.0)	1 (9.1)	0.56	2 (7.7)	2 (5.7)	1.00	4 (7.8)	0 (0.0)	1.00
Malignant Tumours	8 (16.0)	3 (27.3)	0.40	6 (23.1)	5 (14.3)	0.50	10 (19.6)	1 (10.0)	0.67
Neurological Disorders	9 (18.0)	2 (18.2)	1.00	3 (11.5)	8 (22.9)	0.33	7 (13.7)	4 (40.0)	0.07
Trauma	3 (6.0)	1 (9.1)	0.56	0 (0.0)	4 (11.4)	0.13	3 (5.9)	1 (10.0)	0.52
Presence of comorbidities									
Hypertension	20 (40.0)	3 (27.3)	0.51	11 (42.3)	12 (34.3)	0.60	20 (39.2)	3 (30.0)	2.87
Diabetes	12 (24.0)	5 (45.5)	0.26	8 (30.8)	9 (25.7)	0.78	16 (31.4)	1 (10.0)	0.26
Cirrhosis and Liver Disease	6 (12.0)	1 (9.1)	1.00	6 (23.1)	1 (2.9)	0.035	7 (13.7)	0 (0.0)	0.59
Malignant Tumours	8 (16.0)	1 (9.1)	1.00	4 (15.4)	5 (14.3)	1.00	7 (13.7)	2 (20.0)	0.63
Cardiovascular Disease	4 (8.0)	1 (9.1)	1.00	3 (11.5)	2 (5.7)	0.64	4 (7.8)	1 (10.0)	1.00
Renal Failure	4 (8.0)	0 (0.0)	1.00	2 (7.7)	2 (5.7)	1.00	4 (7.8)	0 (0.0)	1.00
Cerebral Infarction	2 (4.0)	2 (18.2)	0.15	2 (7.7)	2 (5.7)	1.00	4 (7.8)	0 (0.0)	1.00
Dyslipidaemia	3 (6.0)	3 (27.3)	0.07	3 (11.5)	3 (8.6)	1.00	5 (9.8)	1 (10.0)	1.00

Table. S3 Clinical characteristics of participants and risk factors associated with Gram-negative drug-resistant bacteria and *S. aureus*.

Strain No.	Pt ID	Isolation site	MLST	SCC _{mec} type	Penicillin	β-lactams	Aminoglycosides		Spectinomycin	Chloramphenicol	Macrolides/Lincosamides/Streptogramin B		Fosfomycin
					<i>blaZ</i>	<i>mecA</i>	<i>aac(6')-aph(2'')</i>	<i>aadD</i>	<i>ant(9)-Ia</i>	<i>cat(pC221)</i>	<i>erm(A)</i>	<i>erm(C)</i>	<i>fosD</i>
HS1	H09	Oral	380	IV(2B)	+	+	+	-	-	-	-	-	-
HS116	H34	Oral	8	IVj(2B)	-	+	+	-	+	-	+	+	+
HS170	H64	Oral	1	IVa(2B)	+	+	-	-	+	-	+	-	-
HS23	H40	Oral	8	IV(2B)	+	+	+	-	-	-	-	-	-
HS98	H29	Oral	30	IVa(2B)	+	+	-	-	+	-	+	-	-
HS118	H34	Nasal	8	IV(2B)	+	+	+	+	-	-	-	-	-
HS172	H64	Nasal	1	IVa(2B)	+	+	-	-	+	-	+	-	-
HS25	H40	Nasal	8	IV(2B)	+	+	+	-	-	-	-	-	-
HS3	H09	Nasal	380	IV(2B)	+	+	+	-	-	-	-	-	-
HS48	H42	Nasal	8	IV(2B)	+	+	+	+	-	-	-	-	-
HS120	H34	Subglottic secretion	8	IV(2B)	-	+	+	-	+	-	+	-	+
HS124	H3	Subglottic secretion	8	IV(2B)	-	+	+	-	+	-	+	-	+
HS128	H35	Subglottic secretion	8	Untypable	+	+	-	-	+	-	+	-	-
HS163-3	H59	Subglottic secretion	8	IV(2B)	-	+	+	-	+	-	+	+	+
HS174	H64	Subglottic secretion	1	IVa(2B)	+	+	-	-	+	-	+	-	-
HS28	H40	Subglottic secretion	8	IV(2B)	+	+	-	-	-	-	-	-	-
HS5	H09	Subglottic secretion	380	IV(2B)	+	+	+	-	-	-	-	-	-
HS90	H27	Subglottic secretion	8	I(1B)	+	+	+	+	+	+	+	-	-

Table. S4 Antimicrobial resistance gene profiles of MRSA.

Table. S5 Isolation rates of *S. aureus* from ICU patients

	Isolation rates	reference
In this study	47.5 % from oral cavity, 39.3% from nasal cavity, 50.8% ETA	this study
Messika et al.	15 to 78 % from oropharyngeal	(11)
Moreira et al.	36.4 % from oropharyngeal	(40)
Honda et al.	27.8 % from nasal cavity (13.1 % MRSA)	(41)
Keene et al.	23 % from nasal cavity	(42)
Wu et al.	24 % from ETA	(43)
Kabak et al.	29.6% from ETA	(44)

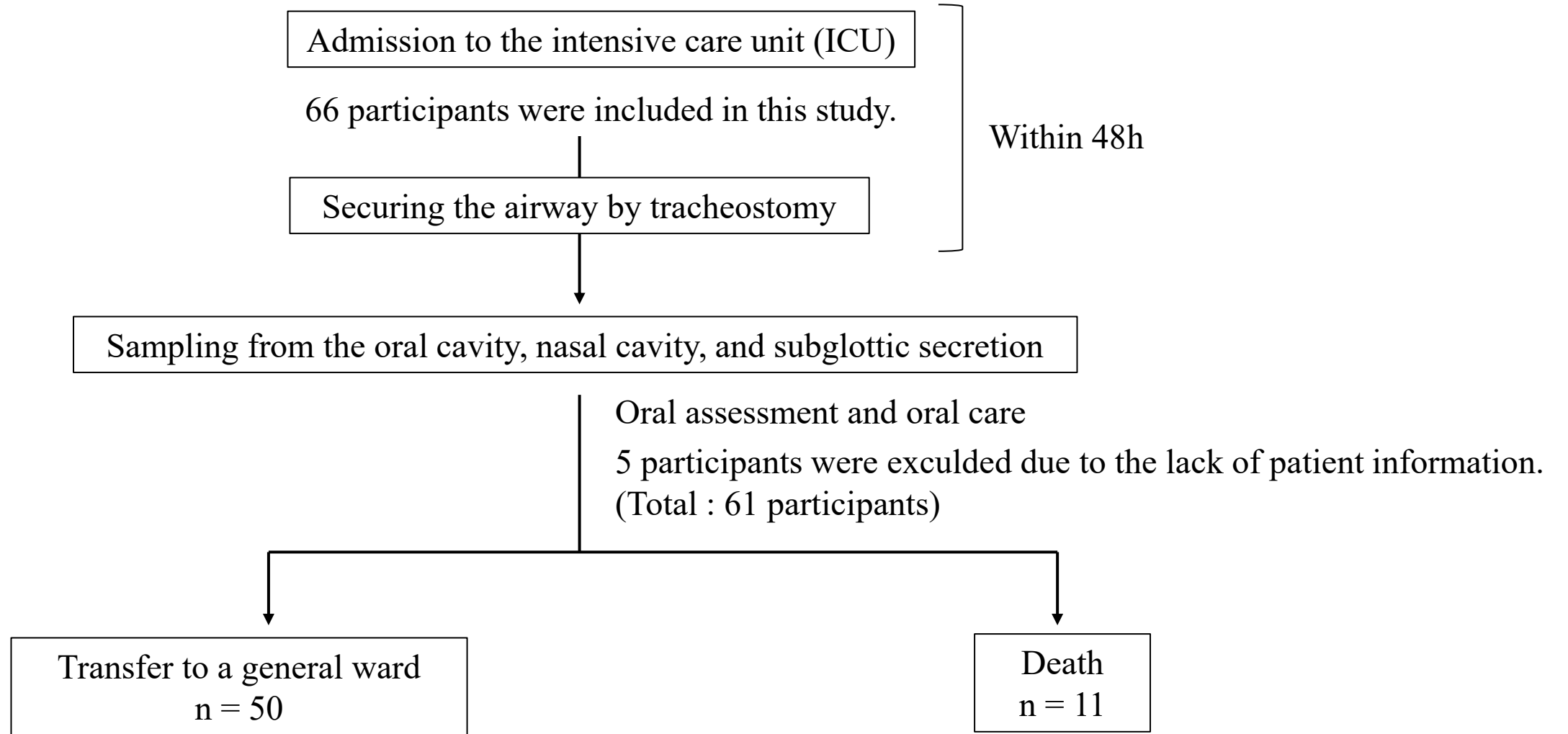


Fig. S1 Flowchart of the participants selection process.

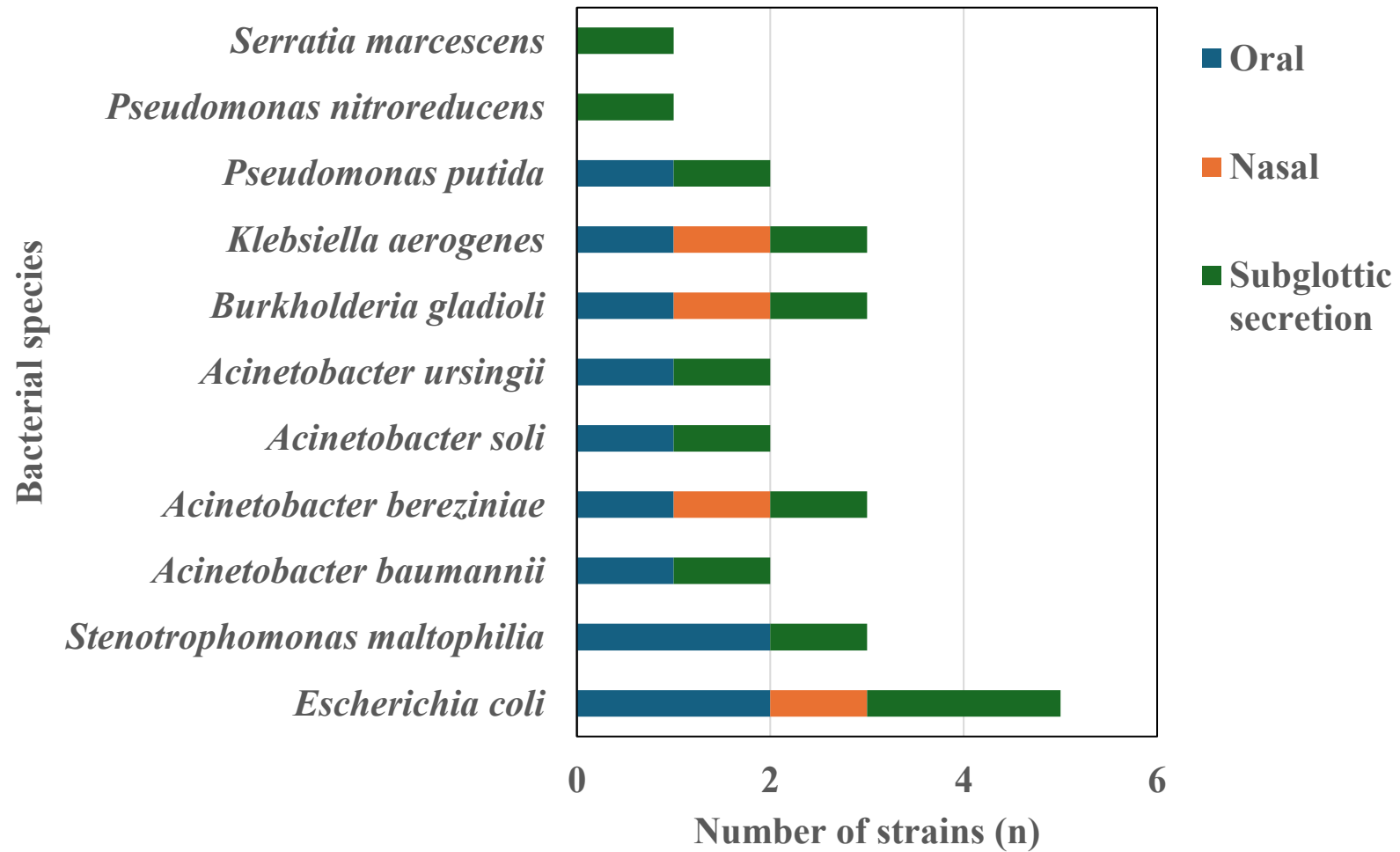


Fig. S2 Species distribution of Gram-negative drug-resistant isolates recovered from the oral cavity, nasal cavity, and subglottic secretion.

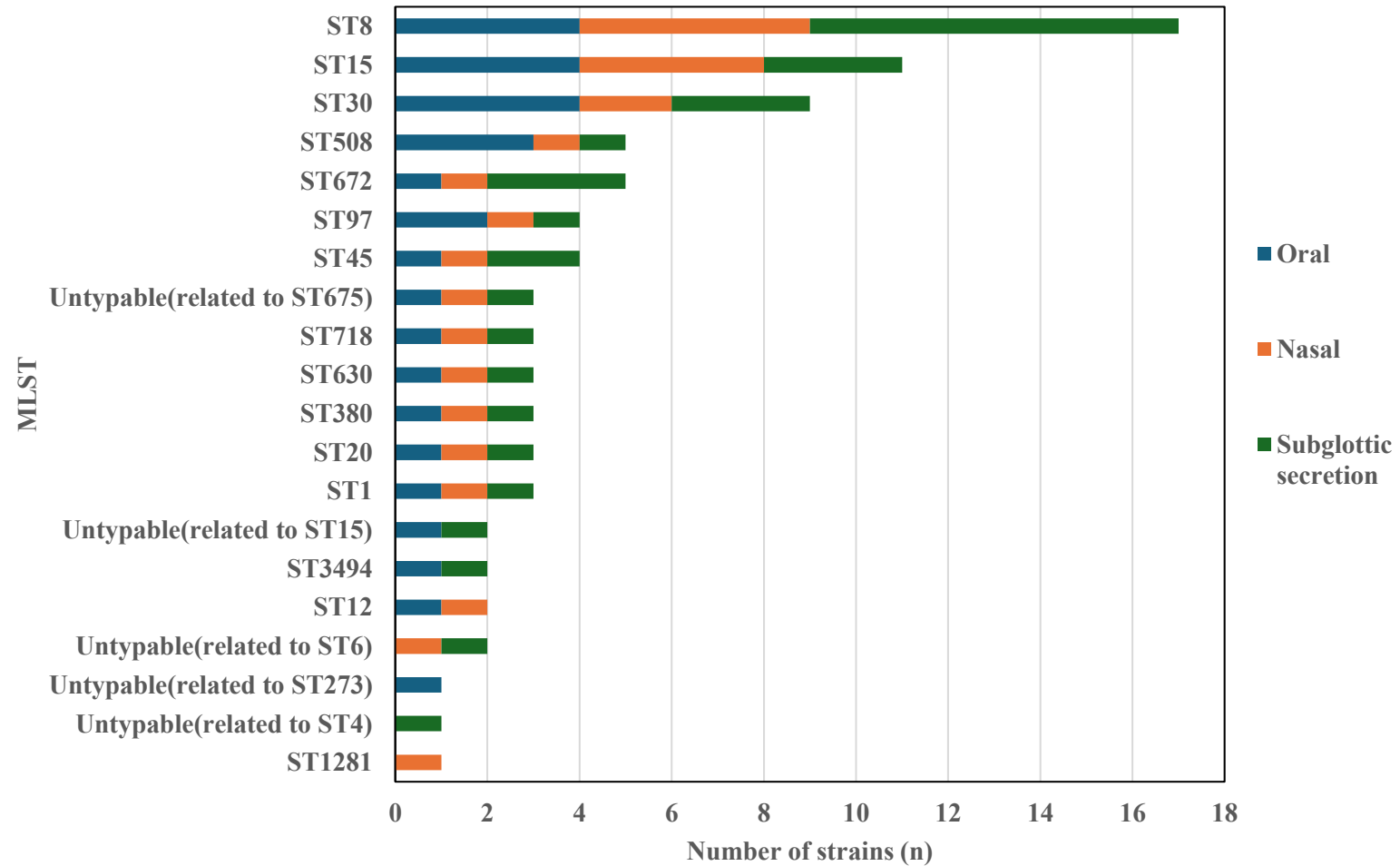


Fig. S3 Multilocus sequence types (MLST) and isolation sites of *S. aureus* (MSSA and MRSA) strains recovered from the oral cavity, nasal cavity, and subglottic secretion.