UK Health Security Agency

Decontamination of household and community settings to prevent recurrence of Panton-Valentine leukocidin-positive *Staphylococcus aureus* (PVL-SA) infection

A rapid systematic review

Contents

Main messages

1. This rapid systematic review (search up to 30 January 2024) identified and assessed the available evidence for strategies to decontaminate household and community settings to prevent recurring infection with Panton-Valentine leukocidin-positive *Staphylococcus aureus*.

2. In total, 1,862 records from 5 databases and registers were screened. No studies were identified for inclusion in this review.

3. In summary, no published randomised controlled trials or non-randomised controlled trials were identified that examined the effectiveness of decontamination methods available to households in either household or community settings for the prevention of recurring infection with Panton-Valentine leukocidin-positive *Staphylococcus aureus*.

Purpose

The purpose of this rapid review was to identify and assess the available evidence for strategies to decontaminate households and shared spaces in community settings to prevent recurring infection with Panton-Valentine leukocidin-positive *Staphylococcus aureus* (PVL-SA). For the purpose of this review, decontamination refers to the reduction or removal of PVL-SA from samples from the environment (such as changing room surfaces), from personal items (such as hairbrushes) or from pets or other animals.

There was one research question:

1. What is the most effective household or shared space decontamination method for an individual affected by PVL-SA skin and soft tissue infection to prevent recurrence?

Methods

A rapid review was conducted, following streamlined systematic methods to accelerate the review process (1). A literature search was completed to look for relevant interventional studies (randomised controlled trials, non-randomised controlled trials) published or available as preprint up to 30 January 2024. The reference lists of relevant systematic reviews were checked to identify any additional primary studies.

A protocol including the review question, the eligibility criteria, and all other methods was produced before the literature search was conducted. Full details of the methodology are provided in the protocol in Annexe A.

There were several deviations from the study protocol, which are outlined along with justifications in Annexe A. Deviations included:

- healthcare settings were changed from being considered as excluded to included settings, as some healthcare settings (such as care homes) may use decontamination methods similar to households or other community settings
- care homes (with and without nursing) were added to the included settings as they may use decontamination methods similar to households or other community settings
- hypochlorous acid was added to the list of included interventions as it was highlighted as an antisepsis agent that may be beneficial for decontamination of settings contaminated with PVL-SA

These deviations required a change to the search strategy. As these changes were made after the initial searches, and screening had been completed, the searches were re-run and screening was redone following the protocol deviations. Results from the previous search and screening were not shared with the review commissioners.

Screening of title and abstracts was completed in duplicate by 2 reviewers for 20% of the eligible studies, with the remainder completed by one reviewer. Screening of full text was completed by one reviewer and checked by a second. Studies excluded at full text screening are available with the reasons why in Annexe C.

Evidence

In total, 1,862 primary studies were screened at title and abstract, with 44 studies included for full text screening. Two additional studies were identified from studies screened at full text, so in total 46 studies were screened at full text. No studies screened at full text were eligible for inclusion in this review. Annexe C lists these studies and their reasons for exclusion, with the main reasons being that it was an excluded study type (n=23) or not having any relevant outcomes (n=13). No relevant systematic reviews for citation searching were identified.

Health inequalities

Community settings more likely to experience health inequalities, including closed accommodation settings such as prisons and group accommodation settings, were explicitly defined within the inclusion criteria in the review protocol. While developing the search strategy, equity-focused databases were scoped. However, no studies were identified for inclusion in this review, so health inequalities could not be assessed.

Limitations

This rapid evidence review used streamlined systematic methods to accelerate the review process. Sources of evidence searched included databases of peer-reviewed and preprint research, but it is possible relevant evidence may have been missed. This review was limited to evidence from interventional studies (randomised controlled trials, non-randomised controlled trials), as these would be the best study designs to answer the research question. However, evidence from other studies (such as single arm studies) or other settings (for example laboratory studies) may exist and provide relevant information in the absence of controlled trial evidence.

Conclusion

The aim of this review was to identify and assess available evidence from interventional studies that evaluated the effectiveness of decontamination strategies in household settings or shared spaces in community settings that had been occupied by an individual affected by PVL-SA to prevent recurring infections. Decontamination methods were limited to those that can be available to household and other community settings.

No relevant evidence was identified for inclusion in this review. Evidence from other studies (such as single arm studies) or other settings (for example laboratory studies) may provide relevant information in the absence of controlled trial evidence to help answer the review question.

Acknowledgment

We would like to thank colleagues within the All Hazards Public Health Response function who either reviewed or input into aspects of the review.

Disclaimer

UKHSA's rapid reviews and evidence summaries aim to provide the best available evidence to decision makers in a timely and accessible way, based on published peer-reviewed scientific papers, and papers on preprint servers. Please note that the reviews:

- use accelerated methods and may not be representative of the whole body of evidence publicly available
- have undergone an internal independent peer review but not an external peer review
- are only valid as of the date stated on the review

In the event that this review is shared externally, please note additionally, to the greatest extent possible under any applicable law, that UKHSA accepts no liability for any claim, loss or damage arising out of, or connected with the use of, this review by the recipient or any third party including that arising or resulting from any reliance placed on, or any conclusions drawn from, the review.

References

1. World Health Organisation (2017). 'Rapid reviews to strengthen health policy and systems: a practical guide'
2. Academy of Nutrition and Dietetics (2016). 'Evidence analysis manual: steps in the academy evidence analysis process'

Annexe A. Protocol

Review question

There is one review question:

1. What is the most effective household or shared space decontamination method for an individual affected by Panton-Valentine leukocidin-positive *Staphylococcus aureus* (PVL-SA) skin and soft tissue infection to prevent recurrence?

A search for primary evidence to answer these review questions will be conducted up to 30 January 2024.

Eligibility criteria

Table A.1 Inclusion and exclusion criteria

	Included	Excluded
Settings	• household and shared spaces (for example, university accommodation) • community settings (for example, sports clubs) • educational settings (for example, schools or nurseries) • group accommodation settings (for example, homeless accommodations, adult social care settings) • other closed accommodation settings (for example, prisons, military bases) • care homes (both with and without nursing)	• hospitals • laboratory settings
Context	Setting or space contaminated by an individual with laboratory confirmed infection with Panton-Valentine leukocidin-positive *Staphylococcus aureus* (PVL-SA).	Setting or space contaminated by an individual with any other skin or soft tissue infection.

	Included	**Excluded**
Intervention or exposure	Decontamination products that are available to households: • steam cleaners • bleach • household detergents or other household cleaning products • hard surface detergent wipes • machine washing of fabrics • vacuuming • cleaning surfaces with a damp cloth • hypochlorous acid	Any decontamination product that is used in a healthcare or laboratory setting (for example, hypochlorite 1,000ppml, Quaternary Ammonium Compounds (Quats), UV light or hydrogen peroxide)
Outcomes	Prevalence (point or period) of PVL-SA for the following: • samples from the environment (for example, changing room surfaces) • samples from personal items (for example, toothbrushes) • samples from pets or other animals	
Language	English	Non-English language studies
Date of publication	Up to 30 January 2024	
Study design	Interventional studies (randomised controlled trials, non-randomised controlled trials)	• systematic or narrative reviews • modelling studies • laboratory studies • cross-sectional studies • cohort studies • case-control studies • case studies • case reports • single-arm trials

	Included	Excluded
Publication type	• published (peer-reviewed) • pre-prints	• guidelines • opinion pieces • letters

Identification of studies

We will search OVID Medline, OVID Embase, Cochrane Central, Web of Science Core Collection and Web of Science Preprint Citation Index for studies published before 30 January 2024. The search strategy will be checked by another information specialist.

Additional studies may be identified through other methods such as grey literature searching or through consultation with topic experts within UKHSA.

Screening

Screening on title and abstract will be undertaken in duplicate by 2 reviewers for at least 20% of the eligible studies, with the remainder completed by one reviewer. Disagreement will be resolved by discussion.

Screening on full text will be undertaken by one reviewer and checked by a second.

Data extraction

Summary information for each study will be extracted and reported in tabular form. Information will include study date, decontamination method used, results, and any relevant contextual data. This will be undertaken by one reviewer and checked by a second.

Risk of bias assessment

We will perform risk of bias assessment at the primary study level using the Quality Criteria Checklist (QCC) (2). Risk of bias will be assessed by 2 reviewers independently with disagreements resolved through discussion or with a third reviewer.

Synthesis

If data is presented in a consistent format between studies, a narrative synthesis will be produced to describe the results from this review. Alternatively, if data are too heterogeneous, a narrative summary of results per study will be provided. Variations between decontamination methods will be synthesised and described if possible.

Search strategy

Database: Ovid MEDLINE(R) ALL <1946 to January 30, 2024>

1. exp Staphylococcus aureus/ (91051)
2. exp Staphylococcal Infections/ (72623)
3. S* aureus.tw,kf. (140419)
4. MRSA.tw,kf. (30002)
5. MSSA.tw,kf. (4398)
6. staphylococc*.tw,kf. (182762)
7. or/1-6 (223336)
8. Leukocidins/ (1728)
9. leukocidin*.tw,kf. (2199)
10. leucocidin*.tw,kf. (536)
11. PVL.tw,kf. (4944)
12. LukS.tw,kf. (364)
13. LukF.tw,kf. (319)
14. Luk pv.tw,kf. (48)
15. or/8-14 (6449)
16. 7 and 15 (3342)
17. exp Infection Control/ (71288)
18. exp Communicable Diseases/pc (92614)
19. (infect* adj3 (prevent* or control*)).tw,kf. (123324)
20. (disease* adj3 (prevent* or control*)).tw,kf. (204794)
21. (bacteri* adj3 (prevent* or control*)).tw,kf. (17842)
22. (spread* adj3 (prevent* or control*)).tw,kf. (18477)
23. (prevent* adj3 transmi*).tw,kf. (17578)
24. Environmental Microbiology/ (8092)
25. clean*.tw,kf. (117690)
26. detergent*.tw,kf. (45720)
27. Decontamination/ (5816)
28. exp Equipment Contamination/ (14691)
29. decontamina*.tw,kf. (16667)
30. disinfect*.tw,kf. (39416)
31. contamina*.tw,kf. (301886)
32. (sterili#ation or sterili#e* or sterili#ing).tw,kf. (42096)
33. (saniti#* or sanitary or sanitation).tw,kf. (35722)
34. (environment* adj5 (hygien* or reservoir*)).tw,kf. (5221)
35. (chlorclean or chloroclean).tw,kf. (1)
36. exp Detergents/ (35703)
37. exp Disinfectants/ (76760)
38. exp Sterilization/ (34518)
39. bleach*.tw,kf. (17172)

40. steam*.tw,kf. (13485)
41. Steam/ (4135)
42. ((high or hot) adj3 (water or temperature*)).tw,kf. (109349)
43. Hot Temperature/ (126011)
44. wash*.tw,kf. (143727)
45. vacuum*.tw,kf. (47550)
46. (household* or house hold* or home*).tw,kf. (754646)
47. social setting*.tw,kf. (1372)
48. gym*.tw,kf. (13063)
49. Housing/ (20387)
50. Fitness Centers/ (682)
51. (fitness adj3 (center* or centre* or equipment or facilit* or club*)).tw,kf. (1272)
52. (sport* adj3 (center* or centre* or equipment or facilit* or club*)).tw,kf. (3174)
53. (changing room* or shower*).tw,kf. (3727)
54. exp Schools/ (149124)
55. (school* or college* or universit* or nurseries or nursery or childcare).tw,kf. (931616)
56. (education* adj3 (building* or facilit* or setting*)).tw,kf. (10759)
57. (public* adj (place* or space* or venue* or area*)).tw,kf. (5626)
58. (communit* adj (place* or space* or venue* or area* or center* or centre* or building* or facilit* or setting*)).tw,kf. (17060)
59. (shared adj (accommodation or place* or space* or area* or facilit* or setting*)).tw,kf. (553)
60. (communal* adj (accommodation or place* or space* or area* or facilit* or setting*)).tw,kf. (263)
61. mass accommodation.tw,kf. (68)
62. ((bed adj (linen or sheet*)) or bedding or towel*).tw,kf. (5610)
63. Ill-Housed Persons/ (10038)
64. homeless*.tw,kf. (14460)
65. social care.tw,kf. (9465)
66. care home*.tw,kf. (5821)
67. (care adj3 (facilit* or setting* or accommodation)).tw,kf. (115577)
68. long-term care.tw,kf. (27636)
69. nursing home*.tw,kf. (37403)
70. ((aged or elderly or old person* or old people*) adj3 home*).tw,kf. (6697)
71. Residential Facilities/ (5757)
72. (residential adj (home* or facilit*)).tw,kf. (2470)
73. prison*.tw,kf. (20616)
74. jail*.tw,kf. (4499)
75. penitentiar*.tw,kf. (827)
76. (detainee* or inmate*).tw,kf. (6815)
77. penal system*.tw,kf. (114)
78. (correctional adj (facilit* or setting*)).tw,kf. (2049)
79. Prisoners/ (18521)
80. exp Correctional Facilities/ (11732)

81. closed setting*.tw,kf. (103)
82. military.tw,kf. (63988)
83. (armed adj (force* or service*)).tw,kf. (7794)
84. Military Personnel/ (45255)
85. ((healthcare or health care) adj3 setting*).tw,kf. (26714)
86. (care home* or nursing home*).tw,kf. (42328)
87. hospice*.tw,kf. (16089)
88. ((healthcare or health care) adj3 facilit*).tw,kf. (22235)
89. exp *Health Facilities/ (512461)
90. (hospital or hospitals).tw. /freq=5 (88285)
91. Hypochlorous Acid/ (3022)
92. (hypochlorite or hypochlorous acid*).tw,kf. (12397)
93. (chloric* acid or chloranol or hydroxidochlorine).tw,kf. (51)
94. (hypochlorite or Chlorine hydroxide or Hypochloric acid or Chlorooxidane).tw,kf. (9858)
95. or/17-94 (3788255)
96. 16 and 95 (823)

Database: Embase <1974 to 2024 January 30>

1. exp Staphylococcus aureus/ (220225)
2. exp Staphylococcus aureus infection/ (18272)
3. S* aureus.tw,kf. (177350)
4. MRSA.tw,kf. (43354)
5. MSSA.tw,kf. (7235)
6. staphylococc*.tw,kf. (212788)
7. or/1-6 (307381)
8. Panton Valentine leukocidin/ (2687)
9. leukocidin.tw,kf. (2570)
10. leucocidin*.tw,kf. (618)
11. PVL.tw,kf. (7534)
12. LukS.tw,kf. (473)
13. LukF.tw,kf. (399)
14. Luk pv.tw,kf. (54)
15. or/8-14 (9362)
16. 7 and 15 (4416)
17. infection control/ (102077)
18. communicable disease control/ (5155)
19. (infect* adj3 (prevent* or control*)).tw,kf. (154970)
20. (disease* adj3 (prevent* or control*)).tw,kf. (274720)
21. (bacteri* adj3 (prevent* or control*)).tw,kf. (20593)
22. (spread* adj3 (prevent* or control*)).tw,kf. (20699)
23. (prevent* adj3 transmi*).tw,kf. (21003)
24. clean*.tw,kf. (150539)
25. detergent*.tw,kf. (49667)

26. decontamination/ (5701)
27. decontamina*.tw,kf. (20337)
28. disinfect*.tw,kf. (45924)
29. environmental microbiology/ (941)
30. contamina*.tw,kf. (354170)
31. (sterili#ation or sterili#e* or sterili#ing).tw,kf. (44201)
32. (saniti#* or sanitary or sanitation).tw,kf. (37035)
33. (environment* adj5 (hygien* or reservoir*)).tw,kf. (6442)
34. (chlorclean or chloroclean).tw,kf. (3)
35. detergent/ (19277)
36. exp disinfectant agent/ (579195)
37. bleach*.tw,kf. (19290)
38. steam*.tw,kf. (16227)
39. ((high or hot) adj3 (water or temperature*)).tw,kf. (103578)
40. high temperature/ (40504)
41. wash*.tw,kf. (192859)
42. vacuum*.tw,kf. (46789)
43. (household* or house hold* or home*).tw,kf. (989537)
44. social setting*.tw,kf. (1748)
45. gym*.tw,kf. (16387)
46. housing/ (31481)
47. exp sport facility/ (3712)
48. (fitness adj3 (center* or centre* or equipment or facilit* or club*)).tw,kf. (1555)
49. (sport* adj3 (center* or centre* or equipment or facilit* or club*)).tw,kf. (4136)
50. (changing room* or shower*).tw,kf. (5155)
51. exp school/ (403688)
52. (school* or college* or universit* or nurseries or nursery or childcare).tw,kf. (1458527)
53. (education* adj3 (building* or facilit* or setting*)).tw,kf. (13820)
54. (public adj (place* or space* or venue* or area*)).tw,kf. (6937)
55. (communit* adj (place* or space* or venue* or area* or center* or centre* or building* or facilit* or setting*)).tw,kf. (23890)
56. (shared adj (accommodation or place* or space* or area* or facilit* or setting*)).tw,kf. (688)
57. (communal* adj (accommodation or place* or space* or area* or facilit* or setting*)).tw,kf. (314)
58. mass accommodation.tw,kf. (89)
59. ((bed adj (linen or sheet*)) or bedding or towel*).tw,kf. (7186)
60. homelessness/ (13818)
61. exp homeless person/ (4045)
62. homeless*.tw,kf. (17906)
63. social care.tw,kf. (12252)
64. care home*.tw,kf. (7721)
65. (care adj3 (facilit* or setting* or accommodation)).tw,kf. (150282)
66. long-term care.tw,kf. (34709)

67. nursing home*.tw,kf. (47996)
68. ((aged or elderly or old person* or old people*) adj3 home*).tw,kf. (8339)
69. residential home/ (7995)
70. nursing home/ (63037)
71. home for the aged/ (11622)
72. (residential adj (home* or facilit*)).tw,kf. (3171)
73. prison*.tw,kf. (23622)
74. jail*.tw,kf. (5410)
75. penitentiar*.tw,kf. (1003)
76. (detainee* or inmate*).tw,kf. (8075)
77. penal system*.tw,kf. (152)
78. (correctional adj (facilit* or setting*)).tw,kf. (2406)
79. prisoner/ (19087)
80. exp correctional facility/ (3591)
81. closed setting*.tw,kf. (123)
82. military.tw,kf. (68687)
83. (armed adj (force* or service*)).tw,kf. (6913)
84. exp military phenomena/ (84281)
85. ((healthcare or health care) adj3 setting*).tw,kf. (33604)
86. exp *health care facility/ (504609)
87. (care home* or nursing home*).tw,kf. (54586)
88. hospice*.tw,kf. (29168)
89. (hospitals or hospital).tw. /freq=5 (140989)
90. hypochlorous acid/ (3891)
91. (hypochlorite or hypochlorous acid*).tw,kf. (13219)
92. (chloric* acid or chloranol or hydroxidochlorine).tw,kf. (50)
93. (hypochlorite or Chlorine hydroxide or Hypochloric acid or Chlorooxidane).tw,kf. (10199)
94. or/17-93 (5192669)
95. 16 and 94 (1344)

Cochrane Central Register of Randomised Controlled Trials

Date Run: 31 January 2024 20:00:11

ID	Search	Hits
#1	MeSH descriptor: [Staphylococcus aureus] explode all trees	1166
#2	MeSH descriptor: [Staphylococcal Infections] explode all trees	1447
#3	(S* aureus):ti,ab,kw (Word variations have been searched)	4299
#4	(MRSA):ti,ab,kw (Word variations have been searched)	1114
#5	(MSSA):ti,ab,kw (Word variations have been searched)	147
#6	(staphylococc*):ti,ab,kw (Word variations have been searched)	6008

ID	Search	Hits
#7	#1 OR #2 OR #3 OR #4 OR #5 OR #6	6549
#8	MeSH descriptor: [Leukocidins] explode all trees	8
#9	(leukocidin*):ti,ab,kw (Word variations have been searched)	20
#10	(leucocidin*):ti,ab,kw (Word variations have been searched)	3
#11	(PVL):ti,ab,kw (Word variations have been searched)	360
#12	(LukS):ti,ab,kw (Word variations have been searched)	11
#13	(LukF):ti,ab,kw (Word variations have been searched)	0
#14	(Luk pv):ti,ab,kw (Word variations have been searched)	2
#15	#8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14	382
#16	#7 AND #15	27
#17	MeSH descriptor: [Infection Control] explode all trees	1652
#18	MeSH descriptor: [Communicable Diseases] explode all trees	28845
#19	(infect* NEAR/3 (prevent* or control*)):ti,ab,kw	24261
#20	(disease* NEAR/3 (prevent* or control*)):ti,ab,kw	89706
#21	(bacteri* NEAR/3 (prevent* or control*)):ti,ab,kw	3381
#22	(spread* NEAR/3 (prevent* or control*)):ti,ab,kw	438
#23	(prevent* NEAR/3 transmi*):ti,ab,kw	3104
#24	MeSH descriptor: [Environmental Microbiology] explode all trees	301
#25	(clean*):ti,ab,kw	11978
#26	(detergent*):ti,ab,kw	638
#27	MeSH descriptor: [Decontamination] explode all trees	139
#28	MeSH descriptor: [Equipment Contamination] explode all trees	432
#29	(decontamina*):ti,ab,kw	1020
#30	(disinfect*):ti,ab,kw	3307
#31	(contamina*):ti,ab,kw	6345
#32	((sterili?ation or sterili?e* or sterili?ing)):ti,ab,kw	3250
#33	(saniti* OR sanitary OR sanitation):ti,ab,kw	1390
#34	(environment* NEAR/5 (hygien* or reservoir*)):ti,ab,kw	149
#35	(chlorclean OR chloroclean):ti,ab,kw	0
#36	MeSH descriptor: [Detergents] explode all trees	419
#37	MeSH descriptor: [Disinfectants] explode all trees	1027
#38	MeSH descriptor: [Sterilization] explode all trees	676
#39	(bleach*):ti,ab,kw	1480

ID	Search	Hits
#40	(steam*):ti,ab,kw	609
#41	MeSH descriptor: [Steam] explode all trees	52
#42	((high or hot) NEAR/3 (water OR temperature*)):ti,ab,kw	3718
#43	MeSH descriptor: [Hot Temperature] explode all trees	2254
#44	(wash*):ti,ab,kw	37544
#45	(vacuum*):ti,ab,kw	2837
#46	(household* or house hold* or home*):ti,ab,kw	82561
#47	(social setting*):ti,ab,kw	9932
#48	(gym*):ti,ab,kw	1877
#49	MeSH descriptor: [Housing] explode all trees	666
#50	MeSH descriptor: [Fitness Centers] explode all trees	52
#51	(fitness NEAR/3 (center* or centre* or equipment or facilit* or club*)):ti,ab,kw	429
#52	(sport* NEAR/3 (center* or centre* or equipment or facilit* or club*)):ti,ab,kw	643
#53	(changing room* or shower*):ti,ab,kw	844
#54	MeSH descriptor: [Schools] explode all trees	4987
#55	(school* or college* or universit* or nurseries or nursery or childcare):ti,ab,kw	130166
#56	(education* NEAR/3 (building* or facilit* or setting*)):ti,ab,kw	1270
#57	(public NEAR/1 (place* or space* or venue* or area*)):ti,ab,kw	265
#58	(communit* NEAR/1 (place* or space* or venue* or area* or center* or centre* or building* or facilit* or setting*)):ti,ab,kw	4188
#59	(shared NEAR/1 (accommodation or place* or space* or area* or facilit* or setting*)):ti,ab,kw	132
#60	(mass accommodation):ti,ab,kw	85
#61	((bed NEAR/1 (linen or sheet*)) or bedding or towel*):ti,ab,kw	1172
#62	MeSH descriptor: [Ill-Housed Persons] explode all trees	497
#63	(homeless*):ti,ab,kw	1204
#64	("social care"):ti,ab,kw	1069
#65	(care NEXT home*):ti,ab,kw	1348
#66	(care NEAR/3 (facilit* or setting* or accommodation)):ti,ab,kw	15782
#67	(long-term care):ti,ab,kw	27623
#68	(nursing NEXT home*):ti,ab,kw	5259
#69	((aged or elderly or old person* or old people*) NEAR/3 home*):ti,ab,kw	3534
#70	MeSH descriptor: [Residential Facilities] explode all trees	2338

ID	Search	Hits
#71	(residential NEXT (home* or facilit*)):ti,ab,kw	510
#72	(prison*):ti,ab,kw	1288
#73	(jail*):ti,ab,kw	362
#74	(penitentiar*):ti,ab,kw	20
#75	(detainee* or inmate*):ti,ab,kw	352
#76	(penal NEXT system*):ti,ab,kw	3
#77	(correctional NEXT (facilit* or setting*)):ti,ab,kw	260
#78	MeSH descriptor: [Prisoners] explode all trees	430
#79	MeSH descriptor: [Correctional Facilities] explode all trees	197
#80	(closed NEXT setting*):ti,ab,kw	5
#81	military:ti,ab,kw	4459
#82	(armed NEXT (force* or service*)):ti,ab,kw	294
#83	MeSH descriptor: [Military Personnel] explode all trees	1348
#84	((healthcare or "health care") NEAR/3 setting*):ti,ab,kw	2215
#85	(care NEXT home* or nursing NEXT home*):ti,ab,kw	6389
#86	(hospice*):ti,ab,kw	1107
#87	(hospital OR hospitals):ti,ab,kw	200763
#88	MeSH descriptor: [Health Facilities] explode all trees	20255
#89	MeSH descriptor: [Hypochlorous Acid] explode all trees	617
#90	(hypochlorite or hypochlorous NEXT acid*):ti,ab,kw	1199
#91	(chloric* NEXT acid or chloranol or hydroxidochlorine):ti,ab,kw	1
#92	(hypochlorite or "Chlorine hydroxide" or "Hypochloric acid" or Chlorooxidane):ti,ab,kw	1140
#93	(3 - #92)	2105455
#94	#16 AND #93	27

Web of Science Core Collection (Edition: Science Citation Index 1970-current)

Date of search: 31 January 2024

TS=("S* aureus") OR TS=(MRSA) OR TS=(MSSA) OR TS=(staphylococc*)

And

TS=(leukocidin) OR TS=(leucocidin*) OR TS=(PVL) OR TS=(LukS) OR TS=(LukF) OR TS=("Luk pv")

And

TS=((infect* NEAR/2 (prevent* or control*))) OR TS=(disease* NEAR/2 (prevent* or control*)) OR TS=(bacteri* NEAR/2 (prevent* or control*)) OR TS=(spread* NEAR/2 (prevent* or control*)) OR TS=(prevent* NEAR/2 transmi*) OR TS=(clean*) OR TS=(detergent*) OR TS=(decontamina*) OR TS=(disinfect*) OR TS=(contamina*) OR TS=(sterili?ation or sterili?e* or sterili?ing) OR TS=(saniti* OR sanitary OR sanitation) OR TS=((environment* NEAR/4 (hygien* or reservoir*))) OR TS=(chlorclean OR chloroclean) OR TS=(bleach*) OR TS=(steam*) OR TS=(((high or hot) NEAR/2 (water OR temperature*))) OR TS=(wash*) OR TS=(vacuum*) OR TS=((household* or "house hold*" or home*)) OR TS=("social setting*") OR TS=(gym*) OR TS=((fitness NEAR/2 (center* or centre* or equipment OR facility* OR club*))) OR TS=(sport* NEAR/2 (center* or centre* or equipment or facilit* or club*)) OR TS=(“changing room*” or shower*) OR TS=(school* or college* or universit* OR nursery OR nurseries OR childcare) OR TS=(education* NEAR/2 (building* or facilit* or setting*)) OR TS=((public NEAR/0 (place* or space* or venue* or area*))) OR TS=(communit* NEAR/0 (place* or space* or venue* or area* or center* or centre* or building* or facilit* or setting*)) OR TS=((shared NEAR/0 (accommodation or place* or space* or area*))) OR TS=(communal* NEAR/0 (accommodation or place* or space* or area* or facilit* or setting*)) OR TS=(bed NEAR/0 (linen or sheet*)) or TS=(bedding or towel*) OR TS=(“mass accommodation”) OR TS=(homeless*) OR TS=(“social care”) OR TS=(care home*”) OR TS=(care NEAR/3 (facilit* or setting* or accommodation)) OR TS=(“long-term care) OR TS=(“nursing home*”) OR TS=((aged or elderly or “old person*” or “old people*”) NEAR/3 home*) OR TS=(residential NEAR/0 (home* or facilit*)) OR TS=(prison* OR jail* OR penitentiar* OR detainee* or inmate* OR “penal system*”) OR TS=(correctional NEAR/0 (facilit* or setting*)) OR TS=(“closed setting*” OR military OR (armed NEAR/0 (force* or service*))) OR TS=(((healthcare or "health care") NEAR/3 setting*) OR (“care home*” or “nursing home*” OR hospice*)) OR TI=(hospital OR hospitals) OR TS=((healthcare or "health care") NEAR/3 facilit*) OR TS=(hypochlorite or “hypochlorous acid*”) OR TS=(“chloric acid*” chloranol or hydroxidochlorine OR hypochlorite or "Chlorine hydroxide" or "Hypochloric acid" or Chlorooxidane)

1,108 results

Web of Science Preprint citation index 1990-current)

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1 result

Protocol deviations

25 January 2024

Healthcare setting removed from excluded settings. Care homes both with and without nursing added to included settings. Care homes with nursing and care homes without nursing were added to included settings for the following reasons:

1. Care homes with nursing differ from acute healthcare settings. The type and frequency of social interactions and personal contact is likely to be greater and the physical environment may also be different, for example, more soft furnishings and greater use of shared spaces such as lounges.
2. While care homes with nursing do tend to be larger than care homes without nursing, there is variation. Some care homes with nursing are small, these are likely to provide care for younger adults and/or people with learning disabilities. The challenges faced here may differ significantly from those in an acute healthcare setting and may not be the same as those faced in care homes without nursing who are likely to have residents with less complex health needs.
3. Care homes with nursing may use cleaning products that are used in healthcare but due to cost, lack of storage space and differing procurement chains this should not be assumed.

Hypochlorous acid (an antisepsis agent) has been added to included interventions or exposures. This intervention has been added as it is another potentially beneficial intervention for decontamination of settings contaminated with PVL-SA.

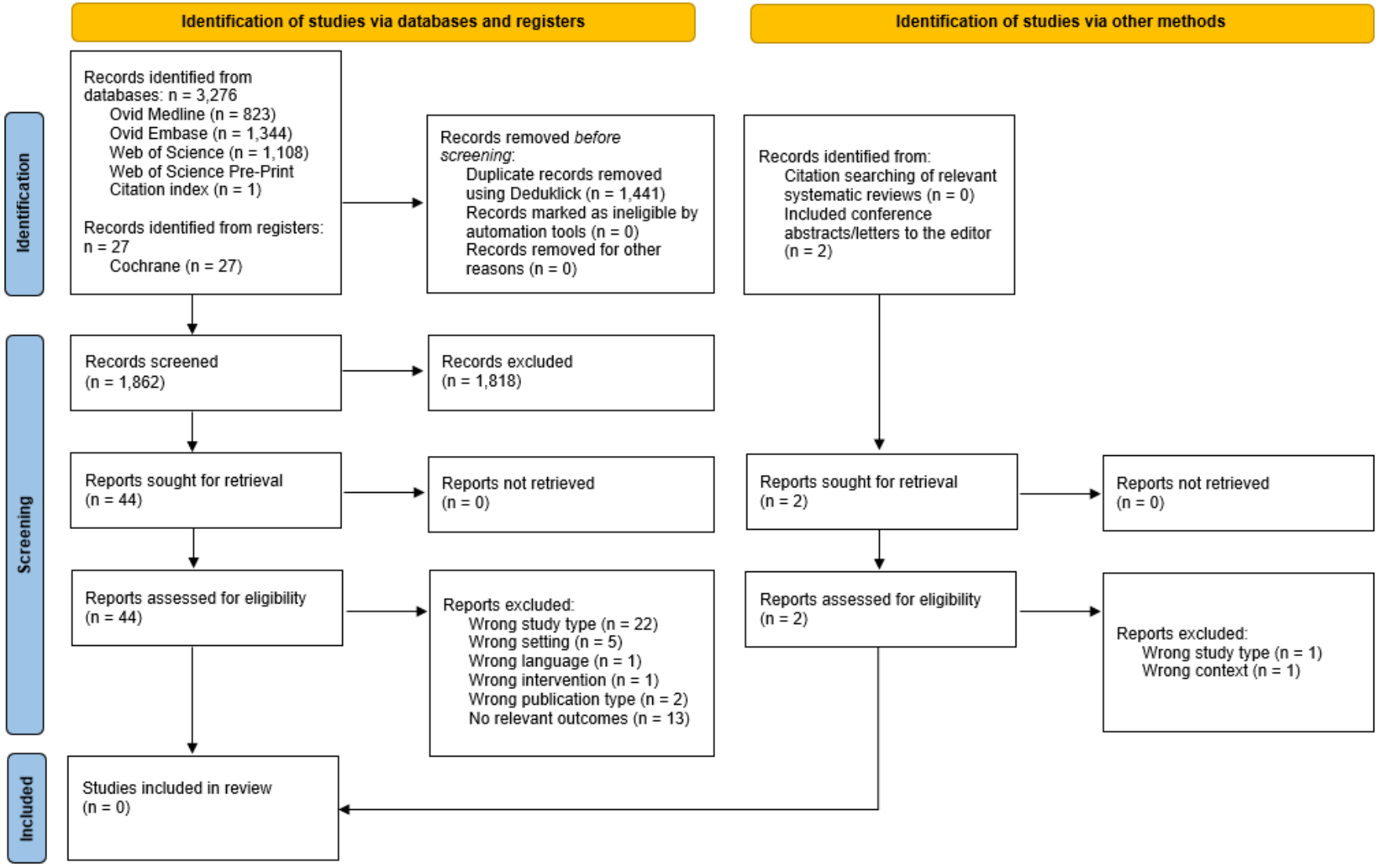
“Hypochlorous acid” and associated terms (hypochlorite, hypochlorous acid*, chloric* acid, chloranol, hydroxidochlorine, Chlorine hydroxide, Hypochloric acid, Chlorooxidane) added to search strategy. This was to include “Hypochlorous acid” as an intervention for decontamination of settings contaminated with PVL-SA.

Additional search terms added to the search strategy to include care homes (healthcare, health care, care home*, nursing home, hospice*, health facilities, hospital, hospitals).

Search strategy date has been updated to 30 January 2024 from 15 November 2023 as searches were updated and re-run to include terms related to Hypochlorous acid and care homes.

Annexe B. Study selection flowchart

Figure B.1. PRISMA diagram



Text version of Figure B.1. PRISMA diagram

A PRISMA diagram showing the flow of studies through this review, ultimately including 0 studies.

From identification of studies via databases and registers, n=3,276 records identified from databases:

- Ovid Medline (n=823)
- Ovid Embase (n=1,344)
- Web of Science (n=1,108)
- Web of Science preprints (n=1)

From identification of studies via databases and registers, n=27 records identified from registers:

- Cochrane CENTRAL (n=27)

From these, records removed before screening:

- duplicate records removed using Deduklick (n=1,441)
- duplicate records removed manually (n=0)
- records marked as ineligible by automation tools (n=0)
- records removed for other reasons (n=0)

n=1,862 records screened, of which n=1,818 were excluded, leaving n=44 papers sought for retrieval, of which n=0 were not retrieved.

Two studies were identified from identification of studies via other methods: n=0 studies were identified from expert consultation.

Of the n=46 papers assessed for eligibility, n=46 reports were excluded:

- wrong context (n=1)
- wrong intervention (n=1)
- not English language (n=1)
- wrong publication type (n=2)
- wrong study type (n=23)
- wrong setting (n=5)
- no relevant outcomes (n=13)

n=0 papers included in the review

Annexe C. Excluded full texts

Wrong setting (5 studies)

Adukwu EC and others. 'A comparison of the sensitivity of 4 *Staphylococcus aureus* isolates to two chlorine-based disinfectants and an eco-friendly commercially available cleaning agent' International Journal of Environmental Health Research 2015: volume 25, issue 2, pages 115 to 125

Gallagher J and others. 'Evaluation of the bactericidal activity of an antiseptic emollient wash formulation against Panton-Valentine leucocidin-producing *Staphylococcus aureus*' British Journal of Dermatology 2013: volume 1, page 57

Kossow A and others. 'Whole genome sequencing reveals a prolonged and spatially spread nosocomial outbreak of Panton-Valentine leucocidin-positive meticillin-resistant *Staphylococcus aureus* (USA300)' Journal of Hospital Infection 2019: volume 101, issue 3, pages 327 to 332

Mehra R and others. 'Whole-genome sequencing links cases dispersed in time, place, and person while supporting healthcare worker management in an outbreak of Panton-Valentine leucocidin meticillin-resistant *Staphylococcus aureus* and a review of literature' Journal of Hospital Infection 2023: volume 141, pages 88 to 98

Sax H and others. 'Control of a cluster of community-associated, methicillin-resistant *Staphylococcus aureus* in neonatology' Journal of Hospital Infection 2006: volume 63, issue 1, pages 93 to 100

Wrong intervention (one study)

Pardos de la Gandara M and others. '*Staphylococcus aureus* infecting and colonizing experimental animals, macaques, in a research animal facility' Microbial Drug Resistance-Mechanisms Epidemiology and Disease 2019: volume 25, issue 1, pages 54 to 62

Not English language (one study)

Bock-Hensley O and others. 'Methicillin-resistant *Staphylococcus aureus* in nursing homes. [German]'. MMW-Fortschritte der Medizin 2009: volume 151, pages 41 to 45

No relevant outcomes (13 studies)

David MZ and others. 'A randomized, controlled trial of chlorhexidine-soaked cloths to reduce methicillin-resistant and methicillin-susceptible *Staphylococcus aureus* carriage prevalence in an urban jail' Infection Control and Hospital Epidemiology 2014: volume 35, issue 12, pages 1,466 to 1,473

Ellis MW and others. 'Targeted intranasal mupirocin to prevent colonization and infection by community-associated methicillin-resistant *Staphylococcus aureus* strains in soldiers: A cluster randomized controlled trial' Antimicrobial Agents and Chemotherapy 2007: volume 51, issue 10, pages 3,591 to 3,598

Gasch O and others. 'Methicillin-susceptible *Staphylococcus aureus* clone related to the early pandemic phage type 80/81 causing an outbreak among residents of 3 occupational centres in Barcelona, Spain' Clinical Microbiology and Infection 2012: volume 18, issue 7, pages 662 to 667

Hanitsch LG and others. 'Outpatient decolonization after recurrent skin infection with Panton-Valentine leukocidin (PVL)-producing *S. aureus*: the importance of treatment repetition' PLoS ONE 2020: volume 15, issue 4, e0231772

Hefzy EM and others. 'Detection of Panton-Valentine leukocidin-positive methicillin-resistant *Staphylococcus aureus* nasal carriage among Egyptian health care workers' Surgical Infections 2016: volume 17, issue 3, pages 369 to 375

Hines CM and others. 'Mupirocin resistance in methicillin-resistant *Staphylococcus aureus* (MRSA) colonized residents in long-term care facilities (LTCFs)'. Journal of Molecular Diagnostics 2011: volume 13, page 745 [Link unavailable]

Jorgensen J and others. 'The majority of MRSA colonized children not given eradication treatment are still colonized one year later: systemic antibiotics improve the eradication rate' Infectious Diseases 2018: volume 50, issue 9, pages 687 to 696

Kang YC and others. 'Methicillin-resistant *Staphylococcus aureus* nasal carriage among patients receiving hemodialysis in Taiwan: Prevalence rate, molecular characterization and de-colonization' BMC Infectious Diseases 2012: volume 12

Karapsias S and others. 'Methicillin-resistant *Staphylococcus aureus* nasal carriage among healthy employees of the Hellenic Air Force' Euro Surveillance: Bulletin Europeen sur les Maladies Transmissibles = European Communicable Disease Bulletin 2008: volume 13, issue 40, page 2

Leistner R and others. 'Pyoderma outbreak among kindergarten families: association with a Panton-Valentine leukocidin (PVL)-producing *S. aureus* strain' PLoS ONE 2017: volume 12, issue 12, e0189961

Longtin Y and others. 'Community-associated methicillin-resistant *Staphylococcus aureus*: risk factors for infection, and long-term follow-up' Clinical Microbiology and Infection 2009: volume 15, issue 6, pages 552 to 559

Matheson A and others. 'Hiding in plain sight: benefit of abrasion and laceration swabs in identification of Panton-Valentine Leucocidin (PVL)-meticillin-resistant *Staphylococcus aureus* (MRSA) colonisation in military personnel' Cureus 2023: volume 15, issue 5, e39487

Wiese-Posselt M and others. 'Successful termination of a furunculosis outbreak due to lukS-lukF-positive, methicillin-susceptible *Staphylococcus aureus* in a German village by stringent decolonization, 2002-2005' Clinical Infectious Diseases 2007: volume 44, issue 11, pages e88 to e95

Wrong study type (23 studies)

Fogo NK, R. Morris-Jones. 'PVL-positive *Staphylococcus aureus* skin infections' British Medical Journal 2011: page 343

Anderson J and others. '*Community-associated methicillin-resistant Staphylococcus aureus*' U.S. 2007, pages HS3 to HS12

Burnham JP and others. 'Prevention of *Staphylococcus aureus* ventilator-associated pneumonia: conventional antibiotics won't cut it' Clinical Infectious Diseases 2017: volume 64, pages 1,089 to 1,091

Cavanagh J and others. 'Challenge of responding to PVL-positive *Staphylococcus aureus* skin infection' BMJ (Online) 2011: volume 343

Dudareva S and others. 'Cases of community-acquired meticillin-resistant *Staphylococcus aureus* in an asylum seekers centre in Germany, November 2010' Eurosurveillance 2011: volume 16, issue 4

Elston DM. 'Community-acquired methicillin-resistant *Staphylococcus aureus*' Journal of the American Academy of Dermatology 2007: volume 56, issue 1, pages 1 to 16

Gould IM and others. 'Can we control MRSA?' Scottish Medical Journal 2007: volume 52, pages 3 to 4

Hall AJ and others. 'Multiclonal outbreak of methicillin-resistant *Staphylococcus aureus* infections on a collegiate football team' Epidemiology and Infection 2009: volume 137, issue 1, pages 85 to 93

Kalavala M and others. 'Panton-Valentine leucocidin-associated *Staphylococcus aureus*: a super bug we need to know' British Journal of Dermatology 2009: volume 1, pages 121 [Link unavailable]

Kalka-Moll WM and others. 'Intrafamilial outbreak of subcutaneous abscesses caused by PVL-positive methicillin-sensitive *Staphylococcus aureus*' Journal of Infection 2008: volume 57, pages 278 to 280

Kapadia S and others. 'Panton-Valentine-producing *Staphylococcus aureus*: what happens to patients after skin decolonization in the community?' Journal of Hospital Infection 2018: volume 100, issue 3, pages 359 to 360

Khoury J and others. 'Eradication of methicillin-resistant *Staphylococcus aureus* from a neonatal intensive care unit by active surveillance and aggressive infection control measures' Infection Control and Hospital Epidemiology 2005: volume 26, issue 7, pages 616 to 621

Lavery MJ and others. 'Beware! the emerging superbug' Archives of Disease in Childhood 2020: volume 105, page A221

Lynch L and others. 'Is decolonization to prevent Panton-Valentine leukocidin-positive *Staphylococcus aureus* infection in the population effective? A systematic review' Journal of Hospital Infection 2022: volume 121, pages 91 to 104

McCarthy O and others. 'Panton-valentine leukocidin *Staphylococcus aureus*: a rare disease' Irish Journal of Medical Science 2017: volume 186, pages S203 to S204

Miller L. 'Treatment paradigms for MRSA' Pediatric Pulmonology 2011: volume 34, pages 139 to 141

Miller LG and others. 'Colonization, fomites, and virulence: rethinking the pathogenesis of community-associated methicillin-resistant *Staphylococcus aureus* infection' Clinical Infectious Diseases 2008: volume 46, issue 5, pages 752 to 760

Mody L and others. 'Epidemiology of *Staphylococcus aureus* colonization in nursing home residents' Clinical Infectious Diseases 2008: volume 46, issue 9, pages 1,368 to 1,373

Romano R and others. 'Outbreak of community-acquired methicillin-resistant *Staphylococcus aureus* skin infections among a collegiate football team' Journal of Athletic Training 2006: volume 41, issue 2, pages 141 to 145

Shallcross LJ and others. 'Should we screen and decolonise contacts of patients with Panton Valentine leukocidin associated Staphylococcus aureus infection?' BMJ (Online) 2011: volume 343

Skov R and others. 'Update on the prevention and control of community-acquired meticillin-resistant *Staphylococcus aureus* (CA-MRSA)' International Journal of Antimicrobial Agents 2012: volume 39, issue 3, pages 193 to 200

Snounou R and others. 'PVl-SA: Management of a 2-household extended family outbreak' Irish Journal of Medical Science 2016: volume 185, pages S535 to S536

Waldeck F and others. 'Outbreak investigation including molecular characterization of community associated methicillin-resistant *Staphylococcus aureus* in a primary and secondary school in Eastern Switzerland' Scientific Reports 2022: volume 12, issue 1, page 19,826

Wrong publication type (2 studies)

Nagarajan A and others. 'Emergence of Panton-Valentine leucocidin among community- and hospital-associated meticillin-resistant *Staphylococcus aureus* in Chennai, South India' Journal of Hospital Infection 2010: volume 76, issue 3, pages 269 to 271

Naumann DN and others. 'Recruiting an infection: is PVL-SA infection a growing risk in a military setting?' Journal of the Royal Army Medical Corps 2012: volume 158, issue 4, page 350 to 351

Wrong context (one study)

Schora and others. 'Impact of detection, education, research and decolonization without isolation in long-term care (DERAIL) on methicillin-resistant *Staphylococcus aureus* colonization and transmission at 3 long-term care facilities.' American Journal of Infection Control 2014: volume 42, pages S269 to S273

About the UK Health Security Agency

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UKHSA is an executive agency, sponsored by the Department of Health and Social Care.

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