

Online Supplement:

Table e1: Systematic Review/Meta-Analysis of Interventions to Reduce *Clostridium difficile* Infection in Acute Care Hospitals

Database	Dates Searched	Number of References Retrieved	Number After Deduplication
MEDLINE (Ovid) and Ovid MEDLINE in-process and other nonindexed citations	2009 to 7/31/2015	1086	982
Cochrane Database of Systematic Reviews	All databases searched 2009 to 08/02/2015	125	125
CENTRAL		130	3
DARE		18	18
HTA Database		7	6
NHS EED		11	10
All databases are part of <i>The Cochrane Library</i> www.thecochranelibrary.com			
EMBASE	2009 to	427	292

	8/01/2015		
CINAHL (EBSCOhost)	2009 to 8/2015	254	239
ISI Web of Knowledge	2009 to	778	558
	8/01/2015		
ClinicalTrials.gov	Searched	4 relevant	4
	8/01/2015	from 24	
		retrieved	
WHO International Clinical Trials Registry Platform	Searched	2 relevant	1
	8/01/2015	from 24	
http://apps.who.int/trialsearch/		retrieved	
AHRQ report from routine alert	Found	1	1
	8/11/2015		
references from hand searches		2	2
Studies found from abstracts		2	2
PubMed similar articles		2100	631
first 50 references from 42 initially included			
Web of Science cited		516	362
reference search from 40 available initially included studies (2 references not in			

Web of Science)

All databases**5461****3236**

MEDLINE

1. exp Clostridium Infections/
2. Clostridium difficile/
3. Clostridium.tw.
4. difficile.tw.
5. or/1-4
6. exp infection control/
7. Secondary Prevention/ or exp Primary Prevention/
8. (pc or ip).fs.
9. (prevent\$ or prophyla\$).tw.
10. or/6-9
11. randomized controlled trial.pt.
12. controlled clinical trial.pt.
13. randomized.ab.
14. placebo.ab.
15. drug therapy.fs.
16. randomly.ab.
17. trial.ab.

18. groups.ab.
19. (Pre test\$ or prettest\$ or post test\$ or posttest\$ or pre post\$ or prepost\$).tw.
20. (Controlled Before or (before adj 2 after)).tw.
21. Interrupted Time.tw.
22. Time Series.tw.
23. or/11-22
24. exp animals/ not humans.sh.
25. 23 not 24
26. and/5,10,25
27. limit 26 to yr="2009 -Current"

The Cochrane Library

- #1 MeSH descriptor: [Clostridium Infections] explode all trees
- #2 MeSH descriptor: [Clostridium difficile] explode all trees
- #3 Clostridium:ti,ab
- #4 difficile:ti,ab
- #5 #1 or #2 or #3 or #4
- #6 MeSH descriptor: [Infection Control] explode all trees
- #7 MeSH descriptor: [Secondary Prevention] this term only
- #8 MeSH descriptor: [Primary Prevention] explode all trees
- #9 Any MeSH descriptor with qualifier(s): [Isolation & purification - IP, Prevention & control - PC]

- #10 (prevent* or prophyla*):ti,ab
- #11 #6 or #7 or #8 or #9 or #10
- #12 #5 and #11 Publication Year from 2009 to 2015

EMBASE

#37 AND (2009:py OR 2010:py OR 2011:py OR 2012:py OR 2013:py OR 2014:py OR 2015:py)

#37. #4 AND #11 AND #35 AND [embase]/lim

#36. #4 AND #11 AND #35

#35. #33 NOT #34

#34. 'animal'/de OR 'nonhuman'/de OR 'animal experiment'/exp NOT ('animal'/de OR 'nonhuman'/de OR 'animal experiment'/exp AND 'human'/exp)

#33. #13 OR #14 OR #15 OR #16 OR #17 OR #19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #28 OR #29 OR #31 OR #32

#32. 'time series':ab,ti

#31. 'interrupted time':ab,ti

#29. 'controlled before':ab,ti OR (before NEAR/2 after):ab,ti

#28. (pre NEAR/2 test*):ab,ti OR prettest*):ab,ti OR (post NEAR/2 test*):ab,ti OR posttest*):ab,ti OR (pre NEAR/2 post*):ab,ti OR prepost*):ab,ti

#26. 'single blind procedure'/de

#25. 'randomized controlled trial'/de

- #24. 'double blind procedure'/de
- #23. 'crossover procedure'/de
- #22. volunteer*:ab,ti
- #21. allocat*:ab,ti
- #20. assign*:ab,ti
- #19. singl*:ab,ti AND next:ab,ti AND blind*:ab,ti
- #18. doubl*:ab,ti AND next:ab,ti AND blind*:ab,ti
- #17. placebo*:ab,ti
- #16. cross:ab,ti AND next:ab,ti AND over*:ab,ti
- #15. crossover*:ab,ti
- #14. factorial*:ab,ti
- #13. random*:ab,ti
- #11. #5 OR #7 OR #9 OR #10
- #10. prevent*:ab,ti OR prophyla*:ab,ti
- #9. 'prevention'/lnk
- #7. 'prevention and control'/exp
- #5. 'infection control'/exp
- #4. #1 OR #2 OR #3
- #3. difficile:ab,ti
- #2. clostridium:ab,ti
- #1. 'clostridium difficile infection'/de

CINAHL

S1 (MH "Clostridium Infections+")

S2 (MH "Clostridium Difficile")

S3 TI Clostridium OR AB Clostridium

S4 TI difficile OR AB difficile

S5 S1 OR S2 OR S3 OR S4

S6 (MH "Infection Control+")

S7 TI (prevent* or prophyla*) OR AB (prevent* or prophyla*)

S8 S6 OR S7

S9 S5 AND S8

ISI Web of Knowledge

#1 TOPIC: (Clostridium) *OR* TOPIC: (difficile)

#2 TOPIC: (prevent*) *OR* TOPIC: (prophyla*)

#3 #2 *OR* #1

#4 TOPIC: (rial* or random* or placebo* or control* or double or treble or triple or blind* or mask* or allocat* or volunteer*)

#5 TOPIC: ("Pre test*" or prettest* or "post test*" or posttest* or "pre post*" or prepost*) *OR*

TOPIC: ("Controlled Before" *OR* "before and after" *OR* "Interrupted Time")

#6 #5 *OR* #4

#7 #6 *AND* #3

Refined by: PUBLICATION YEARS: (2014 OR 2013 OR 2010 OR 2012 OR 2009 OR 2011
OR 2015)

ClinicalTrials.gov

Studies With Results | "Clostridium Infections"

WHO International Clinical Trials Registry Platform

Clostridium OR difficile In Condition

AHRQ, Agency for Healthcare Research and Quality; CENTRAL, Cochrane Central Register of Controlled Trials; CINAHL, Cumulative Index to Nursing and Allied Health Literature; DARE, Database of Abstracts of Reviews of Effects; HTA, Health Technology Assessment; NHS EED, National Health Service Economic Evaluation Database; WHO, World Health organization.

Table e2: Table of included studies

Study	Intervention	Stewardship Mechanism	Study Design	Duration	Pre-intervention	Post-intervention	Pre-intervention Rate (Cases per 10,000 patient-days)	Post-intervention Rate (Cases per 10,000 patient-days)	Quality of Evidence, %
Chan, et al 2011 ⁵¹	Third- and fourth-generation cephalosporins, aminoglycosides (amikacin), carbapenems, oxacephems, monobactams,	Audit and feedback	Uncontrolled before and after study	2003-2009	2003-8/2004	9/2004- 2009	(Rates not reported)	(Rates not reported)	75.0

	extended-spectrum penicillins, fluoroquinolones, glycopeptides, oxazolidinones, and antifungal antimicrobials								
Lee, et al 2014 ⁵²	Carbapenems, moxifloxacin, piperacillin-tazobactam, and vancomycin	Audit and feedback	Uncontrolled before and after study	1/201-6/2013	1/2011-12/2011	1/2012-6/2013	24.2	19.6	100
Nowak, et al 2012 ⁵³	Quinolones, metronidazole, fluconazole, carbapenems, piperacillin-tazobactam	Audit and feedback	Uncontrolled before and after study	1/2003-12/2011	1/2003-12/2006	4/2007-12/2011	3.5-9	5-10	86.7
Talapert,	Fluoroquinolone	Audit and	Retrospecti	1/2006-	1/1/06 -	4/1/2006 -	(Rates not	(Rates not	93.3

et al 2011 ⁵⁴	s, cephalosporins, clindamycin, amoxicillin, and co-amoxiclav	feedback	ve interrupted time series	6/2006	3/31/06	6/30/2006	reported)	reported)	
Yam, et al 2012 ¹²	Piperacillin- tazobactam, imipenem- cilastin, ertapenem, vancomycin, linezolid, and daptomycin	Audit and feedback	Uncontrolle d before and after study	1/201- 6/2011	1/2010- 4/2010	5/2010- 6/2011	8.2	3.1	93.3
Borde, et al 2015 ¹⁵	Cephalosporins and fluoroquinolones	Audit and feedback	Uncontrolle d before and after	1/201- 3/2014	1/2011- 3/2013	4/2013- 3/2014	2.6	1.8	81.3
Cruz, et al 2014 ⁵⁵	Clindamycin	Formulary restriction	Uncontrolle d before and after	12/2011- 10/2013	12/2011- 6/2012	7/2012- 10/2013	10.7	1.2	62.5
Dancer,	Cephalosporins	Formulary	Uncontrolle	1/200-	1/2008-	6/2009-	23.98	5.49	87.5

et al 2013 ¹³	and quinolones	restriction	d before and after	11/2009	6/2008	11/2009			
Sarma, et al 2015 ⁵⁶	Fluoroquinolone s, cefuroxime, third-generation cephalosporins	Formulary restriction	Interrupted time series analysis	2007- 2012	2007-2008	2011-2012	8.9	1.8	81.3
Yu, et al 2014 ⁵⁷	No specific antibiotics	Audit and feedback	Uncontrolle d before and after study with control studies	10/2010- 11/2011			Site 1: 8.4; Site 2: 6.7; Site 3: 6.2	Site 1: 8.3; Site 2: 7.6; Site 3: 9.4	62.5
Elligsen, et al 2012 ²⁷	Third-generation cephalosporins, piperacillin- tazobactam, carbapenems, fluoroquinolones , and vancomycin	All patients who received > 3 days of antibiotics had their case reviewed by an antimicrobial	Prospective, controlled interrupted time series	10/2008- 10/2010	10/2008- 9/2009	10/2009- 10/2010	11.2	7.7	100

		stewardship pharmacist							
Flatley, et al 2015 ²⁶	Elimination of automatic probiotic administration with antibiotics		Retrospective cohort study	12/2008-1/2011	12/2008-12/2009	1/2010 - 1/2011	9.9	10.4	75.0
Maziad, et al 2015 ²⁵	Probiotic (Bio-K+) given to all patients receiving antibiotics		Prospective cohort study	4/2005-5/2014			18.0	2.3	93.3
Bearman, et al 2010 ⁵⁸	Universal gloving with emollient impregnated gloves		Prospective before and after	9/2007-9/2008	9/2007-2/2008	3/2008-9/2008	20	14	87.5
Cheng, et al 2015 ²⁹	Strict contact precautions		Prospective observational study	1/2008-12/2012	1/2008-3/2010	4/2010-12/2012			75.0

Cook, et al 2011 ²⁸	Introduction of an electronic medical record		Retrospective observational study	1/2005-12/2009	1/2005-6/2007	7/2007-12/2009	3.9	3.2	87.5
Bryce, et al 2015 ³⁴	Environmental cleaning and an ASP program with audit and feedback		Before and after study	2011-2014	2011-2012	2013-2014			81.3
Sulis, et al 2014 ⁵⁹	Ventilator-associated pneumonia bundle		Uncontrolled before and after study	7/2001-3/2013	7/2001-3/2006	Phase 1 4/2006-12/2007; Phase 2 1/2008-9/2010; Phase 3 10/2009-6/2011; Phase 4 7/2011-3/2013			80.0
Doron, et	Hand hygiene		Prospective	12/2007-	12/2007-	3/2008-	10/2007: 12;	4/2008: 14;	87.5

al 2011 ¹⁷	campaign		before and after	2/2009	2/2008	2/2009	1/2008: 6	7/2008: 3; 10/2008: 6; 1/2009: 14	
Kirkland, et al 2012 ¹⁶	Hand hygiene campaign with feedback		Interrupted time-series observational		2006	2009	9	6	87.5
Knight, et al 2010 ¹⁹	Alcohol-based hand rub		Retrospective cohort analysis	1/2001-6/2008	1/2001-4/2003	5/2003-6/2008	4.96	3.98	87.5
Stone, et al 2012 ¹⁸	A national hand hygiene campaign		Prospective interrupted time series study		Phase 1: 7/2004-12/2004	Phase 2: 1/2005-6/2005 ; Phase 3: 7/2005-6/2008	16.75	9.49	73.3
Orenstein, et al ⁸	Daily cleaning with bleach		Uncontrolled before and after study	8/1/2008-7/31/2010	8/1/2008-8/1/2009	8/2/2009-7/31/2010	24.2	3.6	68.8

Haas, et al ¹¹	Terminal cleaning with UV light and bleach		Retrospective case-control study	1/2009-4/2013	1/2009-6/2011	7/2011-4/2013	26.7	21.4	87.5
Hacek, et al ⁹	Terminal cleaning with bleach		Uncontrolled before and after study	10/2004-8/2007	10/2004-7/2005	8/2005-8/2007	8.5	4.5	75.0
Levin, et al ¹⁰	Terminal cleaning with UV light and bleach		Uncontrolled before and after study	1/2010-12/2011	1/2010-12/2010	1/2011-12/2011	9.46	4.45	68.8
Manian, et al ⁴⁹	Daily cleaning with bleach and hydrogen peroxide vapor		Retrospective quasi-experimental	1/2007-12/2008	1/2007-12/2008	1/2008-12/2008	9.3	8.8	81.3
Aldeyab, et al 2011 ³²	1) Restrictive ASP, 2) education 3)		Retrospective review	1/2004-12/2008	1/2004-12/2007	1/2008-12/2008	2004: 0.05, 2005: 0.07, 2006: 0.08,	2008: 0.11 (per 100 bed-days)	81.3

	audited daily and terminal environmental disinfection with chlorine						2007: 0.12, (per 100 bed-days)		
Aldeyab, et al 2012 ³³	1) ASP with audit and feedback, 2) daily and terminal environmental disinfection with chlorine		Retrospective ecological investigation	4/2006-6/2010	4/2006-12/2007	1/2008-6/2010	0.02-0.25/100 bed-days	0-0.14/100 bed-days	93.8
Kallen, et al 2009 ⁵⁰	1) Restrictive ASP, 2) environmental services company changed		Retrospective cohort and case-control	6/2005-5/2007	6/2005-5/2006	6/2006-10/2006; 11/2006-5/2007	16	Phase 1: 16, Phase 2: 1.4	75.0
Price, et	1) Patient		Interrupted	2/2007-	2/2007-	1/2008-	13.0	6.9	86.7

al 2010 ³⁵	cohorting, 2) restrictive ASP		time series observational	5/2009	12/2007	5/2009			
Salgado, et al 2009 ⁴¹	1) Contact precautions, 2) daily environmental disinfection with sodium hypochlorite, 3) hand hygiene		Observational Study	10/2004- 5/2005	10/2004- 11/2004	12/2004- 5/2005	55.2	30.2	93.3
You, et al 2014 ⁴⁰	1) Education, 2) patient isolation, 3) contact precautions, 4) hand hygiene, 5) twice daily environmental disinfection with sodium		Uncontrolled before and after study	4/2011 – 12/2012	4/2011- 12/2011	4/2012- 12/2012	47.0	15.3	50.0

	hypochlorite								
Miller, et al 2015 ³¹	1) Hand hygiene with audit, 2) daily environmental cleaning with sodium hypochlorite, 3) checklist with audit for terminal cleaning, 4) UV light terminal cleaning, 5) education, 6) other (disposable equipment)		Uncontrolled before and after study	7/2010-9/2014	7/2010-6/2011	7/2011-6/2012; 7/2012-9/2014	23.3	Phase 1: 19.3; Phase 2: 8.3	68.8
Brakovich, et al 2013 ³⁸	1) Checklist for environmental cleaning with		Before and after study	6/2006-6/2011	6/2006-9/2009	10/2009-6/2011	46.86	28.64	81.3

	audit, 2) terminal cleaning with hydrogen peroxide vapor, 3) contact precautions, 4) hand hygiene, 5) ASP with audit and feedback								
Pokrywka, et al 2014 ³⁷	1) Patient hand hygiene		Uncontrolled before and after study	7/2008-6/2010	7/2008-6/2009	7/2009-6/2010	10.45	6.95	87.5
Suzuki, et al 2013 ³⁶	1) Patient cohorting, 2) contact precautions		Uncontrolled before and after study	4/2010-3/2012	4/2010-6/2011	10/2011-3/2012	4.71	1.08	81.3
Weiss, et al 2009 ³⁹	1) Other (rapid <i>Clostridium difficile</i> testing),		Uncontrolled observation	2003-2007	2003-2004	2006-2007	2002: 0.24; 2003: 0.24; 2004: 0.48	2006: 0.96; 2007: 0.96 (per 1000)	81.3

	2) hand hygiene, 3) patient cohorting, 4) environmental cleaning with dedicated housekeeping team, 5) contact precautions		al study				(per 1000 admissions)	admissions)	
Abbett, et al 2009 ³⁰	1) Education, 2) contact precautions, 3) hand hygiene, 4) terminal cleaning with audit and feedback, 5) treatment guidelines, 6) other (rapid <i>C difficile</i> testing)		Pre-/postintervention study	1/2004-12/2008	1/2004-4/2006	7/2006-12/2008	11	6.6	93.8

<p>Bishop, et al 2013⁴²</p>	<p>1) Resident rounding bundle, 2) limit of team contact with patient to one surgical team member, 3) laboratory coats worn and cleaned frequently, 4) <i>C difficile</i> patients placed on contact precautions, 4) hand hygiene, 5) different operating room scrubs for contact patients,</p>		<p>Pre- /postinterve ntion study</p>		<p>9/2007-8/ 2008</p>	<p>9/2008- 2009</p>	<p>28</p>	<p>18</p>	
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	6) gastric acid suppression protocol								
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Amer, et al 2013 ⁶⁰	<ul style="list-style-type: none"> 1) Formulary restriction 2) prospective audit/feedback 3) education guidelines 4) order form 5) dose optimization 6) antimicrobial cycling 		Retrospective before and after study				Rates not reported	Rates not reported	81.3
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Jenkins, et al 2015 ¹⁴	Antibiotic Stewardship Program with: 1) preauthorization requirement for select broad-spectrum, toxic, or costly antibiotics; 2) postprescription review with real- time feedback to prescribers 3) development and implementation of local guidelines for		Uncontrolled before and after study	7/2005- 9/2014	7/2005 - 6/2008	7/2008- 9/2014	0.5 -0.7 per 1000 patient days	0.7 per 1000 patient days	81.3
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	common infections								
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Kassakia n, et al 2011 ²²	Daily bathing with chlorhexidine gluconate - impregnated cloths		Prospectiv e case control study	1/2008- 3/2010	1/2008 - 12/2010	2/2009 – 12/2010	1.4 per 1000 patient days	1.2 per 1000 patient days	75
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Noto, et al 2015 ²¹	Patients bathed once daily with chlorhexidine gluconate - impregnated cloths		Cluster-randomized crossover study	7/2012-7/2013	7/2012-7/2013	7/2012-7/2013	0.77 per 1000 hospital days	0.68 per 1000 hospital days	80
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Popovich, et al 2009 ²⁰	Patients bathed daily with with chlorhexidine gluconate impregnated cloths vs soap and water		Uncontrolle d before and after study	9/2004 – 10/2006	9/2004 – 10/2005	11/2005 – 10/2006	6 cases per 1000 patient days	2 cases per 1000 patient days	86.7
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Rupp, et al 2012 ²³	<p>Three Cohorts staggered schedule:</p> <ol style="list-style-type: none"> 1) Bed baths 2) Three times a week CHG bathing 3) Daily CHG bathing 		<p>quasi-experimental staged dose escalation study</p>				<p>Cohort 1: 1.25-2 per 1000 patient days</p> <p>Cohort 2: 2.375-1.125 per 1000 patient days</p> <p>Cohort 3: 0.9-1.25/1000 patient days</p>	<p>Cohort 1: 0.5-0.75 per 1000 patient days</p> <p>Cohort 2: 0.25-0.875 per 1000 patient days</p> <p>Cohort 3: 0.4 - 0.75 per 1000 patient days</p>	81.3%
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ASP, antimicrobial stewardship program; UV, ultraviolet.

Table e3. Environmental Interventions: what improvement to expect with intervention

Study	Quality Rating	Specific Intervention	Results	Rate Ratio at End of Study
Haas, et al ¹¹	87.5	Terminal cleaning with UV light; daily bleach cleaning; weekly monitoring of UV machine log use	Significant reduction in CDI rate (26.7 cases per 10,000 patient-days prior to intervention, 21.4 cases per 10,000 patient-days after intervention; $P = .02$)	0.801
Hacek, et al ⁹	75.0	Terminal cleaning with bleach; periodic, unannounced cleaning observations	Significant reduction in CDI rate (8.5 cases per 10,000 patient-days prior to intervention, 4.5 cases per 10,000 patient-days after intervention; $P < .0001$)	0.529
Levin, et al ¹⁰	68.8	Terminal cleaning with UV light and bleach; cleaning was not officially audited	Significant reduction in CDI rate (9.46 cases per 10,000 patient-days prior to intervention, 4.45 cases per 10,000 patient-days after intervention; P	0.470

			= .01)	
Manian, et al ⁴⁹	81.3	Daily cleaning with bleach and hydrogen peroxide vapor; cleaning was not officially audited	Significant reduction in CDI rate (8.8 cases per 10,000 patient-days prior to intervention, 5.5 cases per 10,000 patient-days; <i>P</i> < .0001)	0.625
Orenstein, et al ⁸	68.8	Daily cleaning with bleach; random cleaning audit	Significant reduction in CDI rate (24.2 cases per 10,000 patient-days prior to intervention, 3.6 cases per 10,000 patient-days after intervention; <i>P</i> < .0001)	0.149

CDI, Clostridium difficile infection; UV, ultraviolet.

Table e4. Bundled interventions: what improvement to expect with intervention

Study	Quality Rating	Specific Intervention	Results	What Improvement to Expect
Abbett, et al 2009 ³⁰	93.8	1) Education; 2) contact precautions; 3) hand hygiene; 4) terminal cleaning with audit and feedback; 5) treatment guidelines; 6) other (rapid <i>Clostridium difficile</i> testing)	Significant reduction in CDI rate (11 cases per 10,000 patient-days prior to intervention, 6.6 cases per 10,000 patient-days after intervention; $P = .001$)	0.600
Aldeyab, et al 2011 ³²	81.3	1) Restrictive ASP; 2) education; 3) audited daily and terminal environmental disinfection with chlorine	Significant reduction in CDI rate (12 cases per 10,000 bed-days prior to intervention, 11 cases per 10,000 bed-days after intervention; $P = .003$)	0.917

Aldeyab, et al 2012 ³³	93.8	1) ASP with audit and feedback; 2) daily and terminal environmental disinfection with chlorine	Significant reduction in CDI rate (2-24 cases per 10,000 bed-days prior to intervention, 0-14 cases per 10,000 bed-days after intervention; $P = .0081$)	0.560
Brakovich, et al 2013 ³⁸	81.3	1) Checklist for environmental cleaning with audit; 2) terminal cleaning with hydrogen peroxide vapor; 3) contact precautions; 4) hand hygiene; 5) ASP with audit and feedback	Reduction seen in CDI rates (46.86 cases per 10,000 patient-days prior to intervention, 28.64 cases per 10,000 patient-days after intervention; $P < .001$)	0.611
Bryce, et al 2015 ³⁴	81.3	1) Targeted compulsory cleaning of mobile equipment; 2) ASP with audit and feedback; 3) targeted VRE screening	Significant reduction in CDI rate; $P < .001$	0.442
Kallen. et	75.0	1) Restrictive ASP; 2)	Significant reduction	0.875

al 2009 ⁵⁰		environmental services company changed	in CDI rate (16 cases per 10,000 patient-days prior to intervention, 1.4 -16 cases per 10,000 patient-days after intervention; <i>P</i> = .02)	
Miller, et al 2015 ³¹	68.8	1) Hand hygiene with audit; 2) daily environmental cleaning with sodium hypochlorite; 3) checklist with audit for terminal cleaning; 4) UV light terminal cleaning; 5) education; 6) other (disposable equipment)	Significant reduction in CDI rate (23.3 cases per 10,000 patient-days prior to intervention, 8.3 cases per 10,000 patient-days after intervention; <i>P</i> = .02)	0.356
Pokrywka, et al 2014 ³⁷	87.5	1) Barrier precautions; 2) environmental disinfection; 3) healthcare worker hand hygiene; 4) patient hand hygiene	Significant reduction in CDI rate (10.45 cases per 10,000 patient-days prior to intervention, 6.95 cases per 10,000	0.667

			patient-days after intervention; $P =$.0009)	
Price, et al 2010 ³⁵	86.7	1) Patient cohorting; 2) restrictive ASP	Significant reduction in CDI rate (13 cases per 10,000 patient- days prior to intervention, 6.9 cases per 10,000 patient- days after intervention; $P = .03$)	0.531
Salgado, et al 2009 ⁴¹	93.3	1) Contact precautions; 2) daily environmental disinfection with sodium hypochlorite; 3) hand hygiene	Significant reduction in CDI rate (55.2 cases per 10,000 patient-days prior to intervention, 30.2 cases per 10,000 patient-days after intervention; $P <$.0001)	0.547
Suzuki, et al 2013 ³⁶	81.3	1) Patient cohorting; 2) contact precautions	Significant reduction in CDI rate (4.71 cases per 10,000	0.229

			patient-days prior to intervention, 1.08 cases per 10,000 patient-days after intervention; $P = .001$)	
Weiss, et al 2009 ³⁹	81.3	1) Other (rapid <i>C difficile</i> testing); 2) hand hygiene; 3) patient cohorting; 4) environmental cleaning with dedicated housekeeping team; 5) contact precautions	Significant reduction in CDI rate (2.4 cases per 1,000 admissions prior to intervention, .96 cases per 1,000 admissions after intervention; $P = .001$)	0.388
You, et al 2014 ⁴⁰	50.0	1) Education; 2) patient isolation; 3) Contact precautions; 4) hand hygiene; 5) twice daily environmental disinfection with sodium hypochlorite	Significant reduction in CDI rate (47 cases per 10,000 patient-days prior to intervention, 15.3 cases per 10,000 patient-days after intervention; $P = .012$)	0.326
Bishop, et al 2013 ⁴²		1) Resident rounding bundle; 2) limit of team contact with patient to one	Significant reduction in CDI rate (from 4.13/month to	

surgical team member; 3)	1.93/month; $P=.03$)
laboratory coats worn and cleaned frequently;	Reduction in CDI rate
4) <i>C difficile</i> patients placed on contact precautions;	from 28/10,000 patient-days to 18/10,000 patient-days
4) hand hygiene	(no P value)
5) Different OR scrubs for contact patients	
6) Gastric acid suppression protocol	

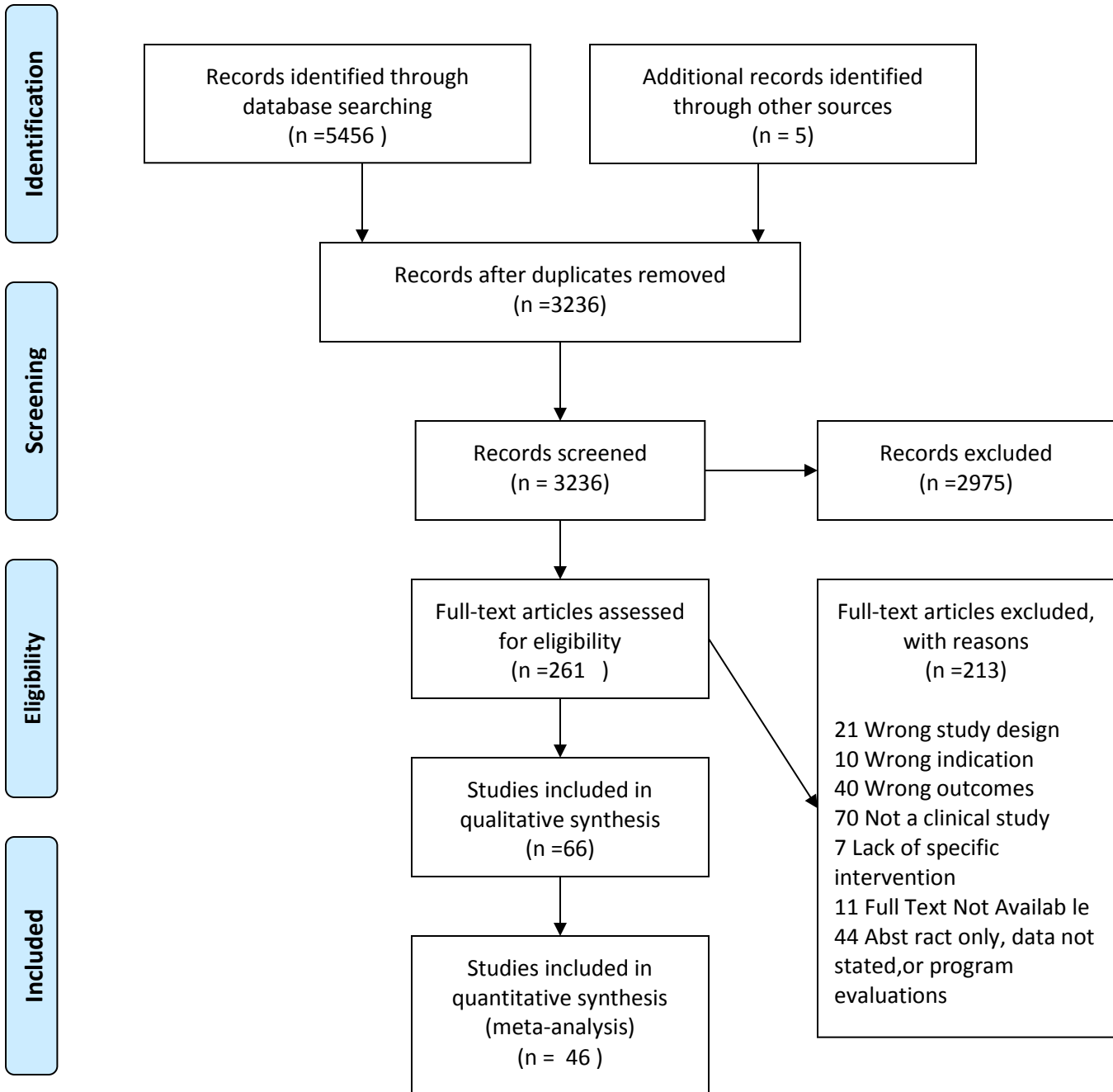
ASP, antimicrobial stewardship program; CDI, *Clostridium difficile* infection; UV, ultraviolet; VRE, vancomycin-resistant *Enterococci*.

Figure e1: PRISMA Diagram for Systematic Review. Illustration of the selection process for included studies for systematic review, per PRISMA guidelines.

PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.



PRISMA 2009 Flow Diagram



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

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