###### PRISMA Checklist

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| --- | --- | --- | --- |
| **Section/topic** | **#** | **Checklist item** | **Included?** |
| **TITLE** | | |  |
| Title | 1 | Identify the report as a systematic review, meta-analysis, or both. | **✓** |
| **ABSTRACT** | | |  |
| Structured summary | 2 | Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number. | **✓** |
| **INTRODUCTION** | | |  |
| Rationale | 3 | Describe the rationale for the review in the context of what is already known. | **✓** |
| Objectives | 4 | Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS). | **✓** |
| **METHODS** | | |  |
| Protocol and registration | 5 | Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number. | **✓** |
| Eligibility criteria | 6 | Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale. | **✓** |
| Information sources | 7 | Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched. | **✓** |
| Search | 8 | Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated. | **✓** |
| Study selection | 9 | State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis). | **✓** |
| Data collection process | 10 | Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators. | **✓** |
| Data items | 11 | List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made. | **✓** |
| Risk of bias in individual studies | 12 | Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis. | **✓** |
| Summary measures | 13 | State the principal summary measures (e.g., risk ratio, difference in means). | **✓** |
| Synthesis of results | 14 | Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I2) for each meta-analysis. | **✓** |

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| **Section/topic** | **#** | **Checklist item** | **Included?** |
| Risk of bias across studies | 15 | Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies). | **✓** |
| Additional analyses | 16 | Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified. | **✓** |
| **RESULTS** | | |  |
| Study selection | 17 | Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram. | **✓** |
| Study characteristics | 18 | For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations. | **✓** |
| Risk of bias within studies | 19 | Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12). | **✓** |
| Results of individual studies | 20 | For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot. | **✓** |
| Synthesis of results | 21 | Present results of each meta-analysis done, including confidence intervals and measures of consistency. | **✓** |
| Risk of bias across studies | 22 | Present results of any assessment of risk of bias across studies (see Item 15). | **✓** |
| Additional analysis | 23 | Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]). | **✓** |
| **DISCUSSION** | | |  |
| Summary of evidence | 24 | Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers). | **✓** |
| Limitations | 25 | Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias). | **✓** |
| Conclusions | 26 | Provide a general interpretation of the results in the context of other evidence, and implications for future research. | **✓** |
| **FUNDING** | | |  |
| Funding | 27 | Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review. | **✓** |

###### Search Strategy

MDRO

Final Strategies

2017 Jul 24

Ovid Multifile

Database: EBM Reviews - Cochrane Database of Systematic Reviews <2005 to July 19, 2017>, EBM Reviews - ACP Journal Club <1991 to July 2017>, EBM Reviews - Database of Abstracts of Reviews of Effects <1st Quarter 2016>, EBM Reviews - Cochrane Central Register of Controlled Trials <June 2017>, EBM Reviews - Cochrane Methodology Register <3rd Quarter 2012>, EBM Reviews - Health Technology Assessment <4th Quarter 2016>, EBM Reviews - NHS Economic Evaluation Database <1st Quarter 2016>, Embase <1988 to 2017 Week 30>, Ovid MEDLINE(R) Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE(R) Daily and Ovid MEDLINE(R) <1946 to Present>

Search Strategy:

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1 Drug Resistance, Multiple/ (51336)

2 Drug Resistance, Multiple, Bacterial/ (50510)

3 1 or 2 (67990)

4 exp Gram-Negative Bacteria/ (1324116)

5 exp Gram-Negative Bacterial Infections/ (367664)

6 4 or 5 (1475268)

7 3 and 6 (20652)

8 exp beta-Lactam Resistance/ (147133)

9 (extended-spectrum adj1 beta-lactamase\*).tw,kw. (17049)

10 (extended-spectrum adj1 betalactamase\*).tw,kw. (376)

11 (extended-spectrum adj2 lactamase\*).tw,kw. (17686)

12 (ESBL or ESBLs or ESBL-E or ESBL-Es).tw,kw. (15820)

13 ((multi?drug-resistan\* or multiple drug-resistan\*) adj1 gram negative?).tw,kw. (1955)

14 ((multi?drug-resistan\* or multiple drug-resistan\*) adj1 GN?).tw,kw. (29)

15 (MDR adj1 gram-negative?).tw,kw. (741)

16 (MDRGN or MDRGNB or MDRGNBs).tw,kw. (88)

17 (gram-negative adj (bacteria\* or bacill\*) adj resistan\*).tw,kw. (322)

18 (GNB adj1 resistan\*).tw,kw. (146)

19 ((multi?drug-resistan\* or multiple drug-resistan\*) adj1 organism?).tw,kw. (2066)

20 (MDR adj1 organism?).tw,kw. (388)

21 (MDRO or MDROs).tw,kw. (911)

22 exp Cephalosporins/ and exp Drug Resistance, Bacterial/ (40007)

23 exp Cephalosporins/ and resistan\*.tw,kw. (55679)

24 ((third-generation\* or 3rd generation\*) adj3 cephalosporin-resistan\*).tw,kw. (412)

25 (3GC resistan\* or 3GCR or 3GC-RE or 3GC-REB or 3GC-R EB).tw,kw. (92)

26 or/7-25 (198396)

27 Levofloxacin/ and exp Drug Resistance, Bacterial/ and exp Escherichia coli/ (1523)

28 exp Ciprofloxacin/ and exp Drug Resistance, Bacterial/ and exp Escherichia coli/ (6484)

29 ((acire or bacquinor or bactiflox or baflox or bay-09867 or bay 9867 or bay q 3939 or bay q3939 or baycip or bernoflox or c-flox or c-floxacin or cetraxal or ciclodin or cidroxal or ciflo or ciflox or cifloxin or cifran or cilab or ciloquin or ciloxan or ciloxin or cimogal or cinaflox or cipflox or cipide or cipio or ciplox or ciplus or cipocin or ciprecu or ciprinol or cipro or ciprobac or ciprobay or ciprobid or ciprobiotic or ciprocan or ciprocep or ciprocin or ciprocinol or ciprodar or ciproflox or ciprofloxacin) adj3 resistan\*).tw,kw. (8527)

30 exp Drug Resistance, Bacterial/ and (acire or bacquinor or bactiflox or baflox or bay-09867 or bay 9867 or bay q 3939 or bay q3939 or baycip or bernoflox or c-flox or c-floxacin or cetraxal or ciclodin or cidroxal or ciflo or ciflox or cifloxin or cifran or cilab or ciloquin or ciloxan or ciloxin or cimogal or cinaflox or cipflox or cipide or cipio or ciplox or ciplus or cipocin or ciprecu or ciprinol or cipro or ciprobac or ciprobay or ciprobid or ciprobiotic or ciprocan or ciprocep or ciprocin or ciprocinol or ciprodar or ciproflox or ciprofloxacin).tw,kw. (15658)

31 ((ciprogis or ciproglen or ciprok or ciprolet or ciprolin or ciprolkan or ciprolon or cipromycin or cipropharm or ciproquin or ciproquinol or ciproval or ciprox or ciproxacol or ciproxan or ciproxin or ciproxina or ciproxine or ciproxyl or cirok or cirokan or cirox or ciroxin or citopcin or cobay or corsacin or cosflox or cycin or cyfloxin or cypral or cyprobay or cysfec) adj3 resistan\*).tw,kw. (7)

32 exp Drug Resistance, Bacterial/ and (ciprogis or ciproglen or ciprok or ciprolet or ciprolin or ciprolkan or ciprolon or cipromycin or cipropharm or ciproquin or ciproquinol or ciproval or ciprox or ciproxacol or ciproxan or ciproxin or ciproxina or ciproxine or ciproxyl or cirok or cirokan or cirox or ciroxin or citopcin or cobay or corsacin or cosflox or cycin or cyfloxin or cypral or cyprobay or cysfec).tw,kw. (44)

33 ((eprocin or fimoflox or flociprin or floroxin or floxager or floxantina or floxbio or gonning or grifociprox or h-next or holdestin or inciflox or iprolan or isotic or jayacin or k-sacin or kenzoflex or kinoves or kipocin or lofucin or loxan or medociprin or mitroken or neofloxin or nivoflox or opthaflox or otiprio or otosec or probiox or procin or proflaxin or profloxin or proksi or proquin or proxacin or qilaflox or qinosyn or quilox or quinobiotic or quinolide or quintor or qupron or rigoran or rofcin or sarf or septicide or septocipro or sifloks or siprogut or sophixin or spitacin or superocin or unex or uniflox or uroxin or zipra or zumaflox) adj3 resistanc\*).tw,kw. (0)

34 exp Drug Resistance, Bacterial/ and (eprocin or fimoflox or flociprin or floroxin or floxager or floxantina or floxbio or gonning or grifociprox or h-next or holdestin or inciflox or iprolan or isotic or jayacin or k-sacin or kenzoflex or kinoves or kipocin or lofucin or loxan or medociprin or mitroken or neofloxin or nivoflox or opthaflox or otiprio or otosec or probiox or procin or proflaxin or profloxin or proksi or proquin or proxacin or qilaflox or qinosyn or quilox or quinobiotic or quinolide or quintor or qupron or rigoran or rofcin or sarf or septicide or septocipro or sifloks or siprogut or sophixin or spitacin or superocin or unex or uniflox or uroxin or zipra or zumaflox).tw,kw. (12)

35 ((levofloxacin or aeroquin or cravit or dr 3355 or dr3355 or elequine or floxacin or floxel or hr 355 or hr355 or iquix or leroxacin or lesacin or levaquin or levokacin or levox or levoxacin or mosardal or mp 376 or mp376 or nofaxin or ofloxacin or oftaquix or prixar or quinsair or quixin or reskuin or tavanic or volequin) adj3 resistan\*).tw,kw. (2798)

36 exp Drug Resistance, Bacterial/ and (levofloxacin or aeroquin or cravit or dr 3355 or dr3355 or elequine or floxacin or floxel or hr 355 or hr355 or iquix or leroxacin or lesacin or levaquin or levokacin or levox or levoxacin or mosardal or mp 376 or mp376 or nofaxin or ofloxacin or oftaquix or prixar or quinsair or quixin or reskuin or tavanic or volequin).tw,kw. (7025)

37 or/29-36 (23974)

38 exp Escherichia coli/ (520998)

39 (bacillus coli or bacillus escherichii or bacterium coli or coli bacillus or coli bacterium or colibacillus or colon bacillus or Enterococcus coli or Escherichia coli or "E. coli" or "E.coli" or Ecoli or EAggEC or Alkalescens-Dispar).tw,kw. (546456)

40 or/38-39 (682726)

41 37 and 40 (5692)

42 27 or 28 or 41 (9685)

43 Vancomycin Resistance/ and exp Enterobacteriaceae/ (31124)

44 VRE.tw,kw. (6328)

45 ((vancomycin or AB-vancomycin or adimicin or amplobac or balcorin or diatracin or edicin or icoplax or ifavac or levovanox or lyphocin or maxivanil or norimko or selamat or vamysin or vanauras or vancam or vancamycin or vanccostacin or vanco or vanco-cell or vanco-teva or vanco azupharma or vanco-saar or vancocid or vancocin or vancocine or vancomicina or vancomycine or vancoled or vancomax or vancomicina or vancomycine or vancor or vancosan or vancox or vankomicin or vankomycin or vanmicina or vanococin or varedet or voncon or vondem) adj3 resistan\*).tw,kw. (17221)

46 exp Enterobacteriaceae/ (717666)

47 (enterobacteriaceae or coliform bacill\* or enteric bacteria\* or enterobacteria\* or ewingella or leclercia or paracolobactrum or paracolo-bactrum or sodalis).tw,kw. (47240)

48 45 and (46 or 47) (2164)

49 43 or 44 or 48 (38018)

50 26 or 42 or 49 (203952)

51 Carrier State/ (70671)

52 carrier?.tw,kw. (364380)

53 carriage?.tw,kw. (28805)

54 coloni\*.tw,kw. (393283)

55 (bacteri\* adj1 colony).tw,kw. (1991)

56 or/51-55 (808666)

57 50 and 56 (19028)

58 exp Risk/ (3079950)

59 (risk or risked or risks or risky or risking or risk-related).tw,kw. (4362973)

60 predict\*.tw,kw. (2933335)

61 logistic\*.tw,kw. (593892)

62 (logit\* adj1 model\*).tw,kw. (3814)

63 Prevalence/ (793317)

64 prevalen\*.tw,kw. (1450814)

65 exp Bacterial Infections/ep [epidemiology] (212868)

66 Incidence/ (508701)

67 (frequenc\* or incidence\* or outbreak? or occurrence? or rate or rates or surveillance\*).tw,kw. (8490737)

68 or/58-67 [RISK] (14446972)

69 57 and 68 (13529)

70 exp infant/ not (exp adult/ and exp infant/) (1348989)

71 exp children/ not (exp adult/ and exp children/) (2461643)

72 69 not (70 or 71) [CHILD-ONLY REMOVED] (11780)

73 exp Animals/ not (exp Animals/ and Humans/) (13421176)

74 72 not 73 [ANIMAL-ONLY REMOVED] (8492)

75 (comment or editorial or interview or news or newspaper article).pt. (1739115)

76 (letter not (letter and randomized controlled trial)).pt. (1831653)

77 74 not (75 or 76) [OPINION PIECES REMOVED] (8346)

78 limit 77 to yr="2000-current" [Limit not valid in DARE; records were retained] (6797)

79 limit 78 to english [Limit not valid in DARE,CLCMR,CLEED; records were retained] (6284)

80 79 use ppez [MEDLINE RECORDS] (2824)

81 multidrug resistance/ (52605)

82 exp Gram negative bacterium/ (582552)

83 Gram negative infection/ (20004)

84 81 and (82 or 83) (9751)

85 antibiotic resistance/ and (beta lactamase/ or (beta-lactamase\* or betalactamase\* or lactamase\*).tw,kw.) (15865)

86 (extended-spectrum adj1 beta-lactamase\*).tw,kw. (17049)

87 (extended-spectrum adj1 betalactamase\*).tw,kw. (376)

88 (extended-spectrum adj2 lactamase\*).tw,kw. (17686)

89 (ESBL or ESBLs or ESBL-E or ESBL-Es).tw,kw. (15820)

90 ((multi?drug-resistan\* or multiple drug-resistan\*) adj1 gram negative?).tw,kw. (1955)

91 ((multi?drug-resistan\* or multiple drug-resistan\*) adj1 GN?).tw,kw. (29)

92 (MDR adj1 gram-negative?).tw,kw. (741)

93 (MDRGN or MDRGNB or MDRGNBs).tw,kw. (88)

94 (gram-negative adj (bacteria\* or bacill\*) adj resistan\*).tw,kw. (322)

95 (GNB adj1 resistan\*).tw,kw. (146)

96 ((multi?drug-resistan\* or multiple drug-resistan\*) adj1 organism?).tw,kw. (2066)

97 (MDR adj1 organism?).tw,kw. (388)

98 (MDRO or MDROs).tw,kw. (911)

99 exp cephalosporin derivative/ and exp bacterial infection/ (54888)

100 exp cephalosporin derivative/ and resistan\*.tw,kw. (46407)

101 ((third-generation\* or 3rd generation\*) adj3 cephalosporin-resistan\*).tw,kw. (412)

102 (3GC resistan\* or 3GCR or 3GC-RE or 3GC-REB or 3GC-R EB).tw,kw. (92)

103 or/84-102 (114620)

104 levofloxacin/ and antibiotic resistance/ and Escherichia coli/ (1385)

105 Ciprofloxacin/ and antibiotic resistance/ and Escherichia coli/ (5580)

106 ((acire or bacquinor or bactiflox or baflox or bay-09867 or bay 9867 or bay q 3939 or bay q3939 or baycip or bernoflox or c-flox or c-floxacin or cetraxal or ciclodin or cidroxal or ciflo or ciflox or cifloxin or cifran or cilab or ciloquin or ciloxan or ciloxin or cimogal or cinaflox or cipflox or cipide or cipio or ciplox or ciplus or cipocin or ciprecu or ciprinol or cipro or ciprobac or ciprobay or ciprobid or ciprobiotic or ciprocan or ciprocep or ciprocin or ciprocinol or ciprodar or ciproflox or ciprofloxacin) adj3 resistan\*).tw,kw. (8527)

107 antibiotic resistance/ and (acire or bacquinor or bactiflox or baflox or bay-09867 or bay 9867 or bay q 3939 or bay q3939 or baycip or bernoflox or c-flox or c-floxacin or cetraxal or ciclodin or cidroxal or ciflo or ciflox or cifloxin or cifran or cilab or ciloquin or ciloxan or ciloxin or cimogal or cinaflox or cipflox or cipide or cipio or ciplox or ciplus or cipocin or ciprecu or ciprinol or cipro or ciprobac or ciprobay or ciprobid or ciprobiotic or ciprocan or ciprocep or ciprocin or ciprocinol or ciprodar or ciproflox or ciprofloxacin).tw,kw. (11971)

108 ((ciprogis or ciproglen or ciprok or ciprolet or ciprolin or ciprolkan or ciprolon or cipromycin or cipropharm or ciproquin or ciproquinol or ciproval or ciprox or ciproxacol or ciproxan or ciproxin or ciproxina or ciproxine or ciproxyl or cirok or cirokan or cirox or ciroxin or citopcin or cobay or corsacin or cosflox or cycin or cyfloxin or cypral or cyprobay or cysfec) adj3 resistan\*).tw,kw. (7)

109 antibiotic resistance/ and (ciprogis or ciproglen or ciprok or ciprolet or ciprolin or ciprolkan or ciprolon or cipromycin or cipropharm or ciproquin or ciproquinol or ciproval or ciprox or ciproxacol or ciproxan or ciproxin or ciproxina or ciproxine or ciproxyl or cirok or cirokan or cirox or ciroxin or citopcin or cobay or corsacin or cosflox or cycin or cyfloxin or cypral or cyprobay or cysfec).tw,kw. (43)

110 ((eprocin or fimoflox or flociprin or floroxin or floxager or floxantina or floxbio or gonning or grifociprox or h-next or holdestin or inciflox or iprolan or isotic or jayacin or k-sacin or kenzoflex or kinoves or kipocin or lofucin or loxan or medociprin or mitroken or neofloxin or nivoflox or opthaflox or otiprio or otosec or probiox or procin or proflaxin or profloxin or proksi or proquin or proxacin or qilaflox or qinosyn or quilox or quinobiotic or quinolide or quintor or qupron or rigoran or rofcin or sarf or septicide or septocipro or sifloks or siprogut or sophixin or spitacin or superocin or unex or uniflox or uroxin or zipra or zumaflox) adj3 resistan\*).tw,kw. (0)

111 antibiotic resistance/ and (eprocin or fimoflox or flociprin or floroxin or floxager or floxantina or floxbio or gonning or grifociprox or h-next or holdestin or inciflox or iprolan or isotic or jayacin or k-sacin or kenzoflex or kinoves or kipocin or lofucin or loxan or medociprin or mitroken or neofloxin or nivoflox or opthaflox or otiprio or otosec or probiox or procin or proflaxin or profloxin or proksi or proquin or proxacin or qilaflox or qinosyn or quilox or quinobiotic or quinolide or quintor or qupron or rigoran or rofcin or sarf or septicide or septocipro or sifloks or siprogut or sophixin or spitacin or superocin or unex or uniflox or uroxin or zipra or zumaflox).tw,kw. (11)

112 ((levofloxacin or aeroquin or cravit or dr 3355 or dr3355 or elequine or floxacin or floxel or hr 355 or hr355 or iquix or leroxacin or lesacin or levaquin or levokacin or levox or levoxacin or mosardal or mp 376 or mp376 or nofaxin or ofloxacin or oftaquix or prixar or quinsair or quixin or reskuin or tavanic or volequin) adj3 resistan\*).tw,kw. (2798)

113 antibiotic resistance/ and (levofloxacin or aeroquin or cravit or dr 3355 or dr3355 or elequine or floxacin or floxel or hr 355 or hr355 or iquix or leroxacin or lesacin or levaquin or levokacin or levox or levoxacin or mosardal or mp 376 or mp376 or nofaxin or ofloxacin or oftaquix or prixar or quinsair or quixin or reskuin or tavanic or volequin).tw,kw. (5424)

114 or/106-113 (21019)

115 Escherichia coli/ (495530)

116 (bacillus coli or bacillus escherichii or bacterium coli or coli bacillus or coli bacterium or colibacillus or colon bacillus or Enterococcus coli or Escherichia coli or "E. coli" or "E.coli" or Ecoli or EAggEC or Alkalescens-Dispar).tw,kw. (546456)

117 115 or 116 (680328)

118 114 and 117 (4985)

119 104 or 105 or 118 (8480)

120 vancomycin/ and antibiotic resistance/ and exp enterobacteriaceae/ (3245)

121 VRE.tw,kw. (6328)

122 ((vancomycin or AB-vancomycin or adimicin or amplobac or balcorin or diatracin or edicin or icoplax or ifavac or levovanox or lyphocin or maxivanil or norimko or selamat or vamysin or vanauras or vancam or vancamycin or vanccostacin or vanco or vanco-cell or vanco-teva or vanco azupharma or vanco-saar or vancocid or vancocin or vancocine or vancomicina or vancomycine or vancoled or vancomax or vancomicina or vancomycine or vancor or vancosan or vancox or vankomicin or vankomycin or vanmicina or vanococin or varedet or voncon or vondem) adj3 resistan\*).tw,kw. (17221)

123 antibiotic resistance/ and (vancomycin or AB-vancomycin or adimicin or amplobac or balcorin or diatracin or edicin or icoplax or ifavac or levovanox or lyphocin or maxivanil or norimko or selamat or vamysin or vanauras or vancam or vancamycin or vanccostacin or vanco or vanco-cell or vanco-teva or vanco azupharma or vanco-saar or vancocid or vancocin or vancocine or vancomicina or vancomycine or vancoled or vancomax or vancomicina or vancomycine or vancor or vancosan or vancox or vankomicin or vankomycin or vanmicina or vanococin or varedet or voncon or vondem).tw,kw. (11809)

124 exp enterobacteriaceae/ (717666)

125 (enterobacteriaceae or coliform bacill\* or enteric bacteria\* or enterobacteria\* or ewingella or leclercia or paracolobactrum or paracolo-bactrum or sodalis).tw,kw. (47240)

126 (122 or 123) and (124 or 125) (2862)

127 120 or 121 or 126 (10627)

128 103 or 119 or 127 (124080)

129 bacterium carrier/ (2749)

130 carrier?.tw,kw. (364380)

131 carriage?.tw,kw. (28805)

132 coloni\*.tw,kw. (393283)

133 (bacteri\* adj1 colony).tw,kw. (1991)

134 or/129-133 (771083)

135 128 and 134 (10886)

136 exp risk/ (3079950)

137 (risk or risked or risks or risky or risking or risk-related).tw,kw. (4362973)

138 prediction/ (291991)

139 predict\*.tw,kw. (2933335)

140 logistic\*.tw,kw. (593892)

141 (logit\* adj1 model\*).tw,kw. (3814)

142 prevalence/ (793317)

143 prevalen\*.tw,kw. (1450814)

144 exp bacterial infection/ep [Epidemiology] (212868)

145 incidence/ (508701)

146 infection rate/ (23094)

147 (frequenc\* or incidence\* or outbreak? or occurrence? or rate or rates or surveillance\*).tw,kw. (8490737)

148 or/136-147 [RISK/INCIDENCE] (14468567)

149 135 and 148 (8336)

150 exp juvenile/ not (exp juvenile/ and exp adult/) (1511507)

151 149 not 150 [CHILD-ONLY REMOVED] (7459)

152 exp animal experimentation/ or exp animal model/ or exp animal experiment/ or nonhuman/ or exp vertebrate/ (41319606)

153 exp human/ or exp human experimentation/ or exp human experiment/ (33244425)

154 152 not 153 (8096575)

155 151 not 154 [ANIMAL-ONLY REMOVED] (6711)

156 editorial.pt. (958098)

157 letter.pt. not (randomized controlled trial/ and letter.pt.) (1831716)

158 155 not (156 or 157) [OPINION PIECES REMOVED] (6635)

159 conference abstract.pt. (2625940)

160 158 not 159 [CONFERENCE ABSTRACTS REMOVED] (5679)

161 limit 160 to yr="2000-current" [Limit not valid in DARE; records were retained] (5044)

162 limit 161 to english [Limit not valid in DARE,CLCMR,CLEED; records were retained] (4678)

163 162 use emed [EMBASE RECORDS] (3020)

164 79 use emed [EMBASE RECORDS] (3335)

165 79 not (80 or 164) (125)

166 conference abstract.pt. (2625940)

167 165 not 166 [EBM DATABASES' RECORDS] (124)

168 80 or 163 or 167 [ALL DATABASES] (5968)

169 remove duplicates from 168 (4437)

170 169 use ppez [MEDLINE UNIQUE RECORDS] (2737)

171 169 use emed [EMBASE UNIQUE RECORDS] (1636)

172 169 not (170 or 171) (64) [EBM DATABASES]

173 journal conference abstract.pt. (74182)

174 172 not 173 [EBM UNIQUE RECORDS - CONFERENCE ABSTRACTS REMOVED] (58)

175 174 use coch [COCHRANE DSR UNIQUE RECORDS] (22)

176 174 use cctr [CENTRAL UNIQUE RECORDS] (19)

177 174 use dare [DARE UNIQUE RECORDS] (1)

178 174 use clhta [HTA UNIQUE REFERENCES] (2)

179 174 use cleed [NHS EED UNIQUE REFERENCES] (12)

180 174 use clcmr [COCHRANE METHODS UNIQUE REFERENCES] (0)

181 174 use acp [ACP UNIQUE REFERENCES] (2)

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

###### PRESS Checklist

**PRESS Guideline 2015— Search Submission & Peer Review Assessment**

Reference: McGowan J, Sampson M, Salzwedel DM, Cogo E, Foerster V, Lefebvre C. PRESS Peer Review of Electronic Search Strategies: 2015 guideline statement. *J Clin Epidemiol* 2016;75:40-6. Available: <http://www.jclinepi.com/article/S0895-4356(16)00058-5/pdf>.

**Search submission: This section to be filled in by the searcher**

Searcher: Becky SkidmoreEmail: bskidmore@rogers.com

Date submitted:20 Jul 2017Date requested by: 22 July 2017

|  |  |
| --- | --- |
| 1. **Systematic Review Title** |  |

Risk Factors SLR: Multidrug-Resistant Gram-Negative Bacteria

|  |
| --- |
| 1. **This search strategy is …** |

|  |  |
| --- | --- |
| x | My PRIMARY (core) database strategy — First time submitting a strategy for search question and database |
|  | My PRIMARY (core) strategy — Follow-up review NOT the first time submitting a strategy for search question and database. If this is a response to peer review, itemize the changes made to the review suggestions |
|  | SECONDARY search strategy— First time submitting a strategy for search question and database |
|  | SECONDARY search strategy — NOT the first time submitting a strategy for search question and database. If  this is a response to peer review, itemize the changes made to the review suggestions |

|  |
| --- |
| 1. **Database** (e.g., MEDLINE, CINAHL) *[mandatory]* |

MEDLINE

|  |
| --- |
| 1. **Interface** (e.g., Ovid, EbscoHost…) *[mandatory]* |

Ovid

|  |
| --- |
| 1. **Research Question** (Describe the purpose of the search)  *[mandatory]* |

Antibiotics are a main risk factor for multidrug-resistant organisms (MDROs), but patients can also acquire MDROs without receiving antibiotics. There is often a subset of patients in studies who are not exposed to antibiotics but they still acquire MDROs. *Intent is to identify the subset of the population that were not previously on antibiotics and to extrapolate the risks and rates of becoming colonized with gram negative bacteria*.

|  |
| --- |
| 1. **PICO Format** Outline the PICOs for your question — i.e., Patient, Intervention, Comparison, Outcome, and Study Design — as applicable |

|  |  |
| --- | --- |
| **P** | Previously noncolonized adult patients (≥18 years) |
| **I** | Antibiotics/no antibiotics |
| **C** | Antibiotics/no antibiotics |
| **O** | - Risk factors for acquired multidrug-resistant gram-negative bacteria  - Acquisition rate of MDROs |
| **S** | Published full-text articles of any study design (include case controls, cohorts, RCTs, etc.) |

|  |
| --- |
| 1. **Inclusion Criteria** (List criteria such as age groups, study designs, etc., to be included) *[optional]*   **This search strategy is …** |

English only, publication year 2000-present

|  |
| --- |
| 1. **Exclusion Criteria** (List criteria such as study designs, date limits, etc., to be excluded) **[optional]** |

- Healthcare workers (HCWs); patients already colonized at time of admission

- Conference abstracts

- Opinion pieces, commentaries, letters

|  |
| --- |
| 1. **Was a search filter applied?** No |

**If YES, which one(s) (e.g., Cochrane RCT filter, PubMed Clinical Queries filter)? Provide the source if this is a published filter.** *[mandatory if YES to previous question* — *textbox]*

|  |
| --- |
| 1. **Notes or comments you feel would be useful for the peer reviewer**  *[optional]* |

Client wishes to include the following:

Extended-spectrum beta-lactamase

Multidrug-resistant gram-negative

Third-generation cephalosporin-resistant

Levofloxacin-resistant Escherichia coli

Ciprofloxacin-resistant Escherichia coli

Vancomycin-resistant enterococci

Search strategies picks up all key citations provided

|  |
| --- |
| 1. **Please copy and paste your search strategy here, exactly as run, including the number of hits per line. [mandatory]** |

Database: Ovid MEDLINE(R) Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE(R) Daily and Ovid MEDLINE(R) <1946 to Present>

Search Strategy:

--------------------------------------------------------------------------------

1 Drug Resistance, Multiple/ (13485)

2 Drug Resistance, Multiple, Bacterial/ (15308)

3 1 or 2 (28764)

4 exp Gram-Negative Bacteria/ (735508)

5 exp Gram-Negative Bacterial Infections/ (341677)

6 4 or 5 (873585)

7 3 and 6 (10834)

8 exp beta-Lactam Resistance/ (25766)

9 (extended-spectrum adj1 beta-lactamase\*).tw,kw. (7473)

10 (extended-spectrum adj1 betalactamase\*).tw,kw. (91)

11 (extended-spectrum adj2 lactamase\*).tw,kw. (7606)

12 (ESBL or ESBLs or ESBL-E or ESBL-Es).tw,kw. (6134)

13 (multi?drug-resistan\* adj1 gram negative?).tw,kw. (833)

14 (multi?drug-resistan\* adj1 GN?).tw,kw. (14)

15 (MDR adj1 gram-negative?).tw,kw. (294)

16 (MDRGN or MDRGNB or MDRGNBs).tw,kw. (31)

17 (gram-negative adj (bacteria\* or bacill\*) adj resistan\*).tw,kw. (156)

18 (GNB adj1 resistan\*).tw,kw. (64)

19 (multi?drug-resistan\* adj1 organism?).tw,kw. (775)

20 (MDR adj1 organism?).tw,kw. (137)

21 (MDRO or MDROs).tw,kw. (299)

22 exp Cephalosporins/ and exp Drug Resistance, Bacterial/ (5227)

23 exp Cephalosporins/ and resistan\*.tw,kw. (8790)

24 ((third-generation\* or 3rd generation\*) adj3 cephalosporin-resistan\*).tw,kw. (170)

25 (3GC resistan\* or 3GCR or 3GC-RE or 3GC-REB or 3GC-R EB).tw,kw. (34)

26 or/7-25 (48967)

27 Levofloxacin/ and exp Drug Resistance, Bacterial/ and exp Escherichia coli/ (41)

28 exp Ciprofloxacin/ and exp Drug Resistance, Bacterial/ and exp Escherichia coli/ (395)

29 ((acire or bacquinor or bactiflox or baflox or bay-09867 or bay 9867 or bay q 3939 or bay q3939 or baycip or bernoflox or c-flox or c-floxacin or cetraxal or ciclodin or cidroxal or ciflo or ciflox or cifloxin or cifran or cilab or ciloquin or ciloxan or ciloxin or cimogal or cinaflox or cipflox or cipide or cipio or ciplox or ciplus or cipocin or ciprecu or ciprinol or cipro or ciprobac or ciprobay or ciprobid or ciprobiotic or ciprocan or ciprocep or ciprocin or ciprocinol or ciprodar or ciproflox or ciprofloxacin) adj3 resistan\*).tw,kw. (3754)

30 exp Drug Resistance, Bacterial/ and (acire or bacquinor or bactiflox or baflox or bay-09867 or bay 9867 or bay q 3939 or bay q3939 or baycip or bernoflox or c-flox or c-floxacin or cetraxal or ciclodin or cidroxal or ciflo or ciflox or cifloxin or cifran or cilab or ciloquin or ciloxan or ciloxin or cimogal or cinaflox or cipflox or cipide or cipio or ciplox or ciplus or cipocin or ciprecu or ciprinol or cipro or ciprobac or ciprobay or ciprobid or ciprobiotic or ciprocan or ciprocep or ciprocin or ciprocinol or ciprodar or ciproflox or ciprofloxacin).tw,kw. (5967)

31 ((ciprogis or ciproglen or ciprok or ciprolet or ciprolin or ciprolkan or ciprolon or cipromycin or cipropharm or ciproquin or ciproquinol or ciproval or ciprox or ciproxacol or ciproxan or ciproxin or ciproxina or ciproxine or ciproxyl or cirok or cirokan or cirox or ciroxin or citopcin or cobay or corsacin or cosflox or cycin or cyfloxin or cypral or cyprobay or cysfec) adj3 resistan\*).tw,kw. (2)

32 exp Drug Resistance, Bacterial/ and (ciprogis or ciproglen or ciprok or ciprolet or ciprolin or ciprolkan or ciprolon or cipromycin or cipropharm or ciproquin or ciproquinol or ciproval or ciprox or ciproxacol or ciproxan or ciproxin or ciproxina or ciproxine or ciproxyl or cirok or cirokan or cirox or ciroxin or citopcin or cobay or corsacin or cosflox or cycin or cyfloxin or cypral or cyprobay or cysfec).tw,kw. (4)

33 ((eprocin or fimoflox or flociprin or floroxin or floxager or floxantina or floxbio or gonning or grifociprox or h-next or holdestin or inciflox or iprolan or isotic or jayacin or k-sacin or kenzoflex or kinoves or kipocin or lofucin or loxan or medociprin or mitroken or neofloxin or nivoflox or opthaflox or otiprio or otosec or probiox or procin or proflaxin or profloxin or proksi or proquin or proxacin or qilaflox or qinosyn or quilox or quinobiotic or quinolide or quintor or qupron or rigoran or rofcin or sarf or septicide or septocipro or sifloks or siprogut or sophixin or spitacin or superocin or unex or uniflox or uroxin or zipra or zumaflox) adj3 resistanc\*).tw,kw. (0)

34 exp Drug Resistance, Bacterial/ and (eprocin or fimoflox or flociprin or floroxin or floxager or floxantina or floxbio or gonning or grifociprox or h-next or holdestin or inciflox or iprolan or isotic or jayacin or k-sacin or kenzoflex or kinoves or kipocin or lofucin or loxan or medociprin or mitroken or neofloxin or nivoflox or opthaflox or otiprio or otosec or probiox or procin or proflaxin or profloxin or proksi or proquin or proxacin or qilaflox or qinosyn or quilox or quinobiotic or quinolide or quintor or qupron or rigoran or rofcin or sarf or septicide or septocipro or sifloks or siprogut or sophixin or spitacin or superocin or unex or uniflox or uroxin or zipra or zumaflox).tw,kw. (1)

35 ((levofloxacin or aeroquin or cravit or dr 3355 or dr3355 or elequine or floxacin or floxel or hr 355 or hr355 or iquix or leroxacin or lesacin or levaquin or levokacin or levox or levoxacin or mosardal or mp 376 or mp376 or nofaxin or ofloxacin or oftaquix or prixar or quinsair or quixin or reskuin or tavanic or volequin) adj3 resistan\*).tw,kw. (1127)

36 exp Drug Resistance, Bacterial/ and (levofloxacin or aeroquin or cravit or dr 3355 or dr3355 or elequine or floxacin or floxel or hr 355 or hr355 or iquix or leroxacin or lesacin or levaquin or levokacin or levox or levoxacin or mosardal or mp 376 or mp376 or nofaxin or ofloxacin or oftaquix or prixar or quinsair or quixin or reskuin or tavanic or volequin).tw,kw. (2604)

37 or/29-35 (8493)

38 exp Escherichia coli/ (259396)

39 (bacillus coli or bacillus escherichii or bacterium coli or coli bacillus or coli bacterium or colibacillus or colon bacillus or Enterococcus coli or Escherichia coli or "E. coli" or "E.coli" or Ecoli or EAggEC or Alkalescens-Dispar).tw,kw. (286301)

40 or/38-39 (361380)

41 37 and 40 (1983)

42 27 or 28 or 41 (2045)

43 Vancomycin Resistance/ and exp Enterobacteriaceae/ (107)

44 VRE.tw,kw. (2534)

45 ((vancomycin or AB-vancomycin or adimicin or amplobac or balcorin or diatracin or edicin or icoplax or ifavac or levovanox or lyphocin or maxivanil or norimko or selamat or vamysin or vanauras or vancam or vancamycin or vanccostacin or vanco or vanco-cell or vanco-teva or vanco azupharma or vanco-saar or vancocid or vancocin or vancocine or vancomicina or vancomycine or vancoled or vancomax or vancomicina or vancomycine or vancor or vancosan or vancox or vankomicin or vankomycin or vanmicina or vanococin or varedet or voncon or vondem) adj3 resistan\*).tw,kw. (7492)

46 exp Enterobacteriaceae/ (369977)

47 (enterobacteriaceae or coliform bacill\* or enteric bacteria\* or enterobacteria\* or ewingella or leclercia or paracolobactrum or paracolo-bactrum or sodalis).tw,kw. (23667)

48 45 and (46 or 47) (561)

49 43 or 44 or 48 (2982)

50 26 or 42 or 49 (52408)

51 Carrier State/ (20775)

52 carrier?.tw,kw. (175637)

53 carriage?.tw,kw. (13163)

54 coloni\*.tw,kw. (186171)

55 (bacteri\* adj1 colony).tw,kw. (900)

56 or/51-55 (375454)

57 50 and 56 (6132)

58 exp Risk/ (1046406)

59 (risk or risked or risks or risky or risking or risk-related).tw,kw. (1813715)

60 predict\*.tw,kw. (1289086)

61 logistic\*.tw,kw. (243202)

62 (logit\* adj1 model\*).tw,kw. (1686)

63 Prevalence/ (246259)

64 prevalen\*.tw,kw. (621843)

65 exp Bacterial Infections/ep [epidemiology] (136269)

66 Incidence/ (227159)

67 (frequenc\* or incidence\* or outbreak? or occurrence? or rate or rates or surveillance\*).tw,kw. (3841618)

68 or/58-67 [RISK] (6426982)

69 57 and 68 (4644)

70 exp infant/ not (exp adult/ and exp infant/) (784747)

71 exp children/ not (exp adult/ and exp children/) (1120798)

72 69 not (70 or 71) [CHILD-ONLY REMOVED] (4025)

73 exp Animals/ not (exp Animals/ and Humans/) (4442323)

74 72 not 73 [ANIMAL-ONLY REMOVED] (3815)

75 (comment or editorial or interview or news or newspaper article).pt. (1224048)

76 (letter not (letter and randomized controlled trial)).pt. (974316)

77 74 not (75 or 76) [OPINION PIECES REMOVED] (3723)

78 limit 77 to yr="2000-current" (3055)

79 limit 78 to english (2821)

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

164 indirect comparison?.tw,kw. (3531)

165 (indirect treatment\* adj1 comparison?).tw,kw. (457)

166 (mixed treatment\* adj1 comparison?).tw,kw. (1130)

167 (multiple treatment\* adj1 comparison?).tw,kw. (196)

168 (multi-treatment\* adj1 comparison?).tw,kw. (3)

169 simultaneous comparison?.tw,kw. (894)

170 mixed comparison?.tw,kw. (33)

171 or/155-170 (613228)

172 108 and 171 [REVIEWS] (162)

173 109 or 154 or 172 [ALL THERAPIES & STUDY DESIGNS (INCLUDING REVIEWS)] (4462)

174 limit 173 to english language (3962)

175 174 use emczd [EMBASE RECORDS] (2908)

176 86 or 175 [BOTH DATABASES] (5220)

177 limit 176 to yr="1990-current" (4050)

178 remove duplicates from 177 (2917) [TOTAL UNIQUE RECORDS]

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

**Peer review assessment: this section to be filled in by the reviewer**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Reviewer: Kaitryn Campbell | Email: [kcamlolo668@gmail.com](mailto:kcamlolo668@gmail.com) | Date completed: 21 Jul 2017 |
|  |  |  |  |

Do you wish to be acknowledged? (If yes, the review team will be advised to add an acknowledgement to any publications related to this work). No – unless your organization requires it

The suggested acknowledgement is “ We thank Xxxxx Yyyyyy, MLIS, AHIP (xxxxx Health Sciences Library, University of xxxxxx) for peer review of the MEDLINE search strategy.” [please edit to indicate your name, postnomials and institutional affiliaton as you would like them presented].

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **1. TRANSLATION** |  |  | | |
| A -­‐No revisions | | X |
| B -­‐ Revision(s) suggested | |  |
| C -­‐ Revision(s) required | |  |

If “B” or “C,” please provide an explanation or example:

**2. BOOLEAN AND PROXIMITY OPERATORS**

|  |  |
| --- | --- |
| A -­‐No revisions | X |
| B -­‐ Revision(s) suggested |  |
| C -­‐ Revision(s) required |  |

If “B” or “C,” please provide an explanation or example:

**3. SUBJECT HEADINGS**

|  |  |
| --- | --- |
| A -­‐No revisions | X |
| B -­‐ Revision(s) suggested |  |
| C -­‐ Revision(s) required |  |

If “B” or “C,” please provide an explanation or example:

**4. TEXT WORD SEARCHING**

|  |  |
| --- | --- |
| A -­‐No revisions |  |
| B -­‐ Revision(s)suggested | X |
| C -­‐ Revision(s) required |  |

If “B” or “C,” please provide an explanation or example:

Lines 13, 14, 19: suggest adding “multiple” variant for all lines, e.g., (multiple drug-resistan\* adj1 gram negative?).tw,kw.

Line 37: should be “or/29-36” instead of “or/29-35”?

Lines 164-178: I think from a previous search and needs to be deleted?

**5. SPELLING, SYNTAX, AND LINE NUMBERS**

|  |  |
| --- | --- |
| A -­‐No revisions | X |
| B -­‐ Revision(s)suggested |  |
| C -­‐ Revision(s) required |  |

If “B” or “C,” please provide an explanation or example:

**6. LIMITS AND FILTERS**

|  |  |
| --- | --- |
| A -­‐No revisions | X |
| B -­‐ Revision(s) suggested |  |
| C -­‐ Revision(s) required |  |

If “B” or “C,” please provide an explanation or example:

OVERALL EVALUATION (Note: If one or more “revision required” is noted above, the response below must be “revisions required”.)

|  |  |
| --- | --- |
| A -­‐No revisions | X |
| B -­‐ Revision(s) suggested |  |
| C -­‐ Revision(s) required |  |

###### Quality In Prognosis Studies (QUIPS)

The Quality in Prognostic Studies (QUIPS) tool was completed in duplicate by two independent reviewers to assess the risk of bias of the included studies. Disagreements were resolved by discussion between the two independent reviewers, or by a third independent reviewer not involved in the assessment process when consensus could not be reached. The results are presented below.

