**Appendix 1: Search Terms used to identify articles for ESBL systematic review**

**MEDLINE via OVID** (Run on June 20, 2014, 15836 results. Rerun August 20, 2015, 2630 results [limited to publication date 2014-2015])

1. exp beta-Lactamases/
2. (ESBL or Beta-lactamase\* or Beta lactamase\* or Beta-lactam resistance or Beta lactam resistance or Cephalosporin\* or amidase cephalexin or cephalexin amidase or Penicillinase\* or Exopenicillinase or Benzylpenicillinase or lactamase rp4 beta or carbenicillinase).tw.
3. exp Klebsiella Infections/ or exp Klebsiella/
4. Klebsiella.tw.
5. exp Escherichia coli/ or exp Escherichia coli Infections/
6. (eaggec or alkalescens-dispar group\* or e coli or escherichia coli).tw.
7. exp Salmonella/
8. Salmonella.tw.
9. exp Pseudomonas/ or exp Pseudomonas Infections/
10. (Pseudomonas or Chryseomonas or flavimonas).tw.
11. exp Enterobacteriaceae Infections/ or exp Enterobacteriaceae/
12. (enteric bacteria or paracolobactrum or coliform bacilli or ENTEROBACTERIACEAE or Escherichia).tw.
13. 1 or 2
14. or/3-12
15. exp Ceftriaxone/
16. (Ceftriaxone or ceftriaxon or terbac or rocefalin or longacef or ceftriaxon hexal or rocephine or ro 139904 or ro13 9904 or ro13-9904 or lendacin or rocephin or ceftriaxona andreu or ro-13-9904 or ro 13 9904 or cefatriaxone or cefaxona or ceftriaxone or ro 13-9904 or ro139904 or ceftrex or longaceph or rocefin or tacex or benaxona or ceftriaxona ldp torlan).tw.
17. exp Cefotaxime/
18. (Cefotaxime or cephotaxim or primafen or cefotaxim or hr-756 or Kendrick or fotexina or biosint or ru 24756 or klaforan or taporin or hr 756 or benaxima or hr756 or claforan or ru24756 or ru-24756 or cefotaxime or cefradil or cefpodoxime or U 76253A or RU 51746 or R 3746 or R 3763).tw.
19. exp Ceftazidime/
20. (Ceftazidime or gr20263 or tazidime or ly 139381 or ly139381 or gr-20263 or gr 20263 or fortaz or fortum or ly-139381).tw.
21. exp Aztreonam/
22. (aztreonam or az-threonam or sq 26776 or azthreonam or sq-26776 or sq26776 or azactam or aztreonam or urobactam or az threonam).tw.
23. (Cefepime or cefepim or Quadrocef or Maxipime or Axepim or BMY 28142 or BMY-28142).tw.
24. 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23
25. 14 and 24
26. 13 or 25
27. exp morbidity/ or exp mortality/
28. exp Epidemiology/
29. exp Epidemiologic Studies/
30. (ae or co or de or ct).fs.
31. (adverse adj2 (effect or effects or reaction or reactions or event or events or outcome or outcomes)).tw.
32. (morbidit\* or mortalit\* or incidence or prevalence or "length of stay" or readmission or readmit\* or "cause of death" or "fatal outome\*" or survival or safe or safety or "side effect\*" or "undesirable effect\*" or "treatment emergent" or tolerability or toxicity or adrs).tw.
33. (occur\* or frequenc\* or proportion\* or rate\* or number\* or percent\*).ti,ab.
34. exp "Length of Stay"/
35. exp Patient Readmission/
36. or/27-35
37. 26 and 36
38. limit 37 to animals
39. limit 37 to humans
40. 38 and 39
41. 38 not 39
42. 37 not 41
43. limit 42 to yr="2000 -Current"

**Cochrane Library** (June 30, 2014, CDSR 23, DARE 10, CENTRAL 565 [post 2000]. Rerun on August 21, 2015, CDSR 24, DARE 11, CENTRAL 733 [post-2000])

1. MeSH descriptor: [beta-Lactamases] explode all trees
2. ESBL or Beta-lactamase\* or Beta lactamase\* or Beta-lactam resistance or Beta lactam resistance or Cephalosporin\* or amidase cephalexin or cephalexin amidase or Penicillinase\* or Exopenicillinase or Benzylpenicillinase or lactamase rp4 beta or carbenicillinase:ti,ab,kw (Word variations have been searched)
3. #1 or #2
4. MeSH descriptor: [Klebsiella] explode all trees
5. MeSH descriptor: [Klebsiella Infections] explode all trees
6. klebsiella:ti,ab,kw (Word variations have been searched)
7. #4 or #5 or #6
8. MeSH descriptor: [Escherichia coli] explode all trees
9. MeSH descriptor: [Escherichia coli Infections] explode all trees
10. eaggec or alkalescens-dispar group\* or e coli or escherichia coli:ti,ab,kw (Word variations have been searched)
11. MeSH descriptor: [Salmonella Infections] explode all trees
12. MeSH descriptor: [Salmonella] explode all trees
13. salmonella:ti,ab,kw (Word variations have been searched)
14. MeSH descriptor: [Proteus Infections] explode all trees
15. MeSH descriptor: [Proteus] explode all trees
16. proteus:ti,ab,kw (Word variations have been searched)
17. MeSH descriptor: [Pseudomonas] explode all trees
18. MeSH descriptor: [Pseudomonas Infections] explode all trees
19. Pseudomonas or Chryseomonas or flavimonas:ti,ab,kw (Word variations have been searched)
20. MeSH descriptor: [Enterobacteriaceae Infections] explode all trees
21. MeSH descriptor: [Enterobacteriaceae] explode all trees
22. enteric bacteria or paracolobactrum or coliform bacilli or Enterobacteriaceae:ti,ab,kw (Word variations have been searched)
23. #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22
24. MeSH descriptor: [Ceftriaxone] explode all trees
25. Ceftriaxone or ceftriaxon or terbac or rocefalin or longacef or rocephine or "ro 139904" or "ro13 9904" or "ro13 9904" or lendacin or rocephin or "ceftriaxona andreu" or "ro 13 9904" or cefatriaxone or cefaxona or ceftriaxone or "ro 13 9904" or ro139904 or ceftrex or longaceph or rocefin or tacex or benaxona or "ceftriaxona ldp torlan":ti,ab,kw (Word variations have been searched)
26. MeSH descriptor: [Cefotaxime] explode all trees
27. Cefotaxime or cephotaxim or primafen or cefotaxim or Kendrick or fotexina or biosint or "ru 24756" or klaforan or taporin or "hr 756" or benaxima or hr756 or claforan or ru24756 or cefotaxime or cefradil or cefpodoxime or "U 76253A" or "RU 51746" or "R 3746" or "R 3763":ti,ab,kw (Word variations have been searched)
28. MeSH descriptor: [Ceftazidime] explode all trees
29. Ceftazidime or gr20263 or tazidime or ly 139381 or ly139381 or "gr 20263" or fortaz or fortum or "ly 139381":ti,ab,kw (Word variations have been searched)
30. #24 or #25 or #26 or #27 or #28 or #29
31. MeSH descriptor: [Aztreonam] explode all trees
32. aztreonam or "sq 26776" or azthreonam or sq26776 or azactam or aztreonam or urobactam or "az threonam":ti,ab,kw (Word variations have been searched)
33. Cefepime or cefepim or Quadrocef or Maxipime or Axepim or "BMY 28142":ti,ab,kw (Word variations have been searched)
34. #30 or #31 or #32 or #33
35. #23 and #34
36. #3 or #35
37. MeSH descriptor: [Morbidity] explode all trees
38. MeSH descriptor: [Mortality] explode all trees
39. MeSH descriptor: [Epidemiology] explode all trees
40. MeSH descriptor: [Epidemiologic Studies] explode all trees
41. MeSH descriptor: [Length of Stay] explode all trees
42. MeSH descriptor: [Patient Readmission] explode all trees
43. adverse near/2 (effect or effects or reaction or reactions or event or events or outcome or outcomes):ti,ab,kw (Word variations have been searched)
44. morbidit\* or mortalit\* or incidence or prevalence or "length of stay" or readmission or readmit\* or "cause of death" or "fatal outome\*" or survival or safe or safety or "side effect\*" or "undesirable effect\*" or "treatment emergent" or tolerability or toxicity or adrs:ti,ab,kw (Word variations have been searched)
45. (occur\* or frequenc\* or proportion\* or rate\* or number\* or percent\*):ti or (occur\* or frequenc\* or proportion\* or rate\* or number\* or percent\*):ab (Word variations have been searched)
46. #37 or #38 or #39 or #40 or #41 or #42 or #43 or #44 or #45
47. #36 and #46

**Web of Science** (Run on July 1, 2014- 11,218 Results. Rerun August 20, 2015, 2280 results [limited to publication date 2014-2015])

1. (ESBL OR “Beta lactamase\*” OR “Beta-lactam resistance” OR “Beta lactam resistance” OR Cephalosporin\* OR “amidase cephalexin” OR “cephalexin amidase” OR Penicillinase\* OR Exopenicillinase OR Benzylpenicillinase OR “lactamase rp4 beta” OR carbenicillinase)
2. (Klebsiella OR eaggec OR “alkalescens-dispar group\*” OR “e coli” OR escherichia OR Salmonella OR Proteus OR Pseudomonas OR Chryseomonas OR flavimonas OR “enteric bacteria” OR paracolobactrum OR “coliform bacilli” OR ENTEROBACTERIACEAE)
3. (Ceftriaxone OR ceftriaxon OR terbac OR rocefalin OR longacef OR rocephine OR ro 139904 OR “ro13 9904” OR lendacin OR rocephin OR “ceftriaxona andreu” OR “ro 13 9904” OR cefatriaxone OR cefaxona OR ceftriaxone OR “ro 13-9904” OR ro139904 OR ceftrex OR longaceph OR rocefin OR tacex OR benaxona OR “ceftriaxona ldp torlan” OR Cefotaxime or cephotaxim or primafen or cefotaxim or Kendrick or fotexina or biosint or "ru 24756" or klaforan or taporin or "hr 756" or benaxima or hr756 or claforan or ru24756 or cefotaxime or cefradil or cefpodoxime or "U 76253A" or "RU 51746" or "R 3746" or "R 3763" OR Ceftazidime OR gr20263 OR tazidime OR ly 139381 OR ly139381 OR “gr 20263” OR fortaz OR fortum OR “ly 139381” OR aztreonam OR “sq 26776” OR azthreonam OR sq26776 OR azactam OR aztreonam OR urobactam OR “az threonam” OR Cefepime OR cefepim OR Quadrocef OR Maxipime OR Axepim OR “BMY 28142”)
4. #2 And #3
5. #1 OR #4
6. adverse Near/2 (effect or effects or reaction or reactions or event or events or outcome or outcomes)
7. morbidit\* or mortalit\* or incidence or prevalence or “length of stay” or readmission or readmit\* or “cause of death” or “fatal outome\*” OR survival OR safe or safety or “side effect\*” or “undesirable effect\*” or “treatment emergent” or tolerability or toxicity or adrs
8. (occur\* OR frequenc\* OR proportion\* OR rate\* OR number\* OR percent\*) – in topic since abstract isn’t an option.
9. #6 or #7 or #8
10. #5 AND #9

**Scopus** (Run on July 7, 2014- 27,494 results. Rerun on August 24, 2015, 3458 results [limited to publication date 2014-present])

1. (ESBL OR “Beta lactamase\*” OR “Beta-lactam resistance” OR “Beta lactam resistance” OR Cephalosporin\* OR “amidase cephalexin” OR “cephalexin amidase” OR Penicillinase\* OR Exopenicillinase OR Benzylpenicillinase OR “lactamase rp4 beta” OR carbenicillinase)
2. (Klebsiella OR eaggec OR “alkalescens-dispar group\*” OR “e coli” OR escherichia OR Salmonella OR Proteus OR Pseudomonas OR Chryseomonas OR flavimonas OR “enteric bacteria” OR paracolobactrum OR “coliform bacilli” OR ENTEROBACTERIACEAE)
3. Ceftriaxone OR ceftriaxon OR terbac OR rocefalin OR longacef OR rocephine OR "ro 139904" OR "ro13 9904" OR lendacin OR rocephin OR "ceftriaxona andreu" OR "ro 13 9904" OR cefatriaxone OR cefaxona OR ceftriaxone OR "ro 13-9904" OR ro139904 OR ceftrex

OR

tacex OR benaxona OR "ceftriaxona ldp torlan" OR Cefotaxime or cephotaxim or primafen or cefotaxim or Kendrick or fotexina or biosint or "ru 24756" or klaforan or taporin or "hr 756" or benaxima or hr756 or claforan or ru24756 or cefotaxime or cefradil

OR

"U 76253A" or "RU 51746" or "R 3746" or "R 3763" OR Ceftazidime OR gr20263 OR tazidime OR "ly 139381" OR "ly139381" OR "gr 20263" OR fortaz OR fortum OR "ly 139381" OR aztreonam OR "sq 26776" OR azthreonam OR sq26776 OR azactam OR aztreonam OR urobactam

OR

“az threonam” OR Cefepime OR cefepim OR Quadrocef OR Maxipime OR Axepim OR “BMY 28142” OR longaceph OR rocefin or cefpodoxime

1. #2 And #3
2. #1 OR #4
3. adverse W/2 (effect or effects or reaction or reactions or event or events or outcome or outcomes)
4. morbidit\* or mortalit\* or incidence or prevalence or “length of stay” or readmission or readmit\* or “cause of death” or “fatal outome\*” OR survival OR safe or safety or “side effect\*” or “undesirable effect\*” or “treatment emergent” or tolerability

OR

toxicity or adrs

1. (occur\* OR frequenc\* OR proportion\* OR rate\* OR number\* OR percent\*) – in title abstract only
2. 6 OR 7 OR 8
3. 5 AND 9

**CINAHL** (Run on July 14, 2014, 5125 results. Rerun on August 24, 2015, 609 results [limited to publication date 2014-present)

1. MH "Morbidity+"OR MH "Mortality+" OR MH "Epidemiological Research+" OR MH "Epidemiology+" OR MH "Length of Stay" OR MH "Readmission"
2. MW “ae” OR MW “co” OR MW “ct” OR MW “de”
3. adverse N2 (effect or effects or reaction or reactions or event or events or outcome or outcomes)
4. morbidit\* or mortalit\* or incidence or prevalence or “length of stay” or readmission or readmit\* or “cause of death” or “fatal outome\*” OR survival OR safe or safety or side effect\* or undesirable effect\* or treatment emergent or tolerability or toxicity or adrs
5. (occur\* OR frequenc\* OR proportion\* OR rate\* OR number\* OR percent\*).ti,ab.
6. S1 OR S2 OR S3 OR S4 OR S5
7. (MH "Antibiotics, Lactam+")
8. ESBL OR “Beta lactamase\*” OR “Beta-lactam resistance” OR “Beta lactam resistance” OR Cephalosporin\* OR “amidase cephalexin” OR “cephalexin amidase” OR Penicillinase\* OR Exopenicillinase OR Benzylpenicillinase OR “lactamase rp4 beta” OR carbenicillinase
9. S7 OR S8
10. MH "Enterobacteriaceae+" OR MH "Enterobacteriaceae Infections+" OR (MH "Pseudomonas") OR (MH "Pseudomonas Infections")
11. Klebsiella OR eaggec OR “alkalescens-dispar group\*” OR “e coli” OR Escherichia OR Salmonella OR Proteus OR Pseudomonas OR Chryseomonas OR flavimonas OR “enteric bacteria” OR paracolobactrum OR “coliform bacilli” OR ENTEROBACTERIACEAE
12. S10 OR S11
13. MH "Ceftriaxone"
14. Ceftriaxone OR ceftriaxon OR terbac OR rocefalin OR longacef OR rocephine OR ro 139904 OR “ro13 9904” OR lendacin OR rocephin OR “ceftriaxona andreu” OR “ro 13 9904” OR cefatriaxone OR cefaxona OR ceftriaxone OR “ro 13-9904” OR ro139904 OR ceftrex OR longaceph OR rocefin OR tacex OR benaxona OR “ceftriaxona ldp torlan”
15. MH "Cefotaxime+"
16. Cefotaxime or cephotaxim or primafen or cefotaxim or Kendrick or fotexina or biosint or "ru 24756" or klaforan or taporin or "hr 756" or benaxima or hr756 or claforan or ru24756 or cefotaxime or cefradil or cefpodoxime or "U 76253A" or "RU 51746" or "R 3746" or "R 3763"
17. MH "Ceftazidime"
18. Ceftazidime OR gr20263 OR tazidime OR ly 139381 OR ly139381 OR “gr 20263” OR fortaz OR fortum OR “ly 139381”
19. MH "Aztreonam"
20. aztreonam OR “sq 26776” OR azthreonam OR sq26776 OR azactam OR aztreonam OR urobactam OR “az threonam”
21. Cefepime OR cefepim OR Quadrocef OR Maxipime OR Axepim OR “BMY 28142”
22. S13 OR S14 OR S15 OR S16 OR S17 OR S19 OR S20 OR S21
23. S12 AND S22
24. S9 OR S23
25. S6 AND S24

**Ovid Medline Economics** (Run on July 16, 2014, 656 results. Rerun on August 24, 2015, 133 results. [Limited to publication date 2014-present])

1. exp beta-Lactamases/
2. (ESBL or Beta-lactamase\* or Beta lactamase\* or Beta-lactam resistance or Beta lactam resistance or Cephalosporin\* or amidase cephalexin or cephalexin amidase or Penicillinase\* or Exopenicillinase or Benzylpenicillinase or lactamase rp4 beta or carbenicillinase).tw.
3. exp Klebsiella Infections/ or exp Klebsiella/
4. Klebsiella.tw.
5. exp Escherichia coli/ or exp Escherichia coli Infections/
6. (eaggec or alkalescens-dispar group\* or e coli or escherichia coli).tw.
7. exp Salmonella/
8. Salmonella.tw.
9. exp Pseudomonas/ or exp Pseudomonas Infections/
10. (Pseudomonas or Chryseomonas or flavimonas).tw.
11. exp Enterobacteriaceae Infections/ or exp Enterobacteriaceae/
12. (enteric bacteria or paracolobactrum or coliform bacilli or ENTEROBACTERIACEAE or Escherichia).tw.
13. 1 or 2
14. or/3-12
15. exp Ceftriaxone/
16. (Ceftriaxone or ceftriaxon or terbac or rocefalin or longacef or ceftriaxon hexal or rocephine or ro 139904 or ro13 9904 or ro13-9904 or lendacin or rocephin or ceftriaxona andreu or ro-13-9904 or ro 13 9904 or cefatriaxone or cefaxona or ceftriaxone or ro 13-9904 or ro139904 or ceftrex or longaceph or rocefin or tacex or benaxona or ceftriaxona ldp torlan).tw.
17. exp Cefotaxime/
18. (Cefotaxime or cephotaxim or primafen or cefotaxim or hr-756 or Kendrick or fotexina or biosint or ru 24756 or klaforan or taporin or hr 756 or benaxima or hr756 or claforan or ru24756 or ru-24756 or cefotaxime or cefradil or cefpodoxime or U 76253A or RU 51746 or R 3746 or R 3763).tw.
19. exp Ceftazidime/
20. (Ceftazidime or gr20263 or tazidime or ly 139381 or ly139381 or gr-20263 or gr 20263 or fortaz or fortum or ly-139381).tw.
21. exp Aztreonam/
22. (aztreonam or az-threonam or sq 26776 or azthreonam or sq-26776 or sq26776 or azactam or aztreonam or urobactam or az threonam).tw.
23. (Cefepime or cefepim or Quadrocef or Maxipime or Axepim or BMY 28142 or BMY-28142).tw.
24. 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23
25. 14 and 24
26. 13 or 25
27. economics/
28. exp "costs and cost analysis"/
29. economics, dental/
30. exp "economics, hospital"/
31. economics, medical/
32. economics, nursing/
33. economics, pharmaceutical/
34. (economic$ or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic$).ti,ab.
35. (expenditure$ not energy).ti,ab.
36. (value adj1 money).ti,ab.
37. budget$.ti,ab.
38. or/27-37
39. ((energy or oxygen) adj cost).ti,ab.
40. (metabolic adj cost).ti,ab.
41. ((energy or oxygen) adj expenditure).ti,ab.
42. or/39-41
43. 38 not 42
44. 26 and 43
45. limit 44 to animals
46. limit 44 to humans
47. 45 and 46
48. 45 not 47
49. 44 not 48

**CINAHL Economics** (Run on July 16, 2014, 1055 results. Rerun on August 24, 2015, 133 results [limited to publication date 2014-present])

1. (MH "Antibiotics, Lactam+")
2. ESBL OR “Beta lactamase\*” OR “Beta-lactam resistance” OR “Beta lactam resistance” OR Cephalosporin\* OR “amidase cephalexin” OR “cephalexin amidase” OR Penicillinase\* OR Exopenicillinase OR Benzylpenicillinase OR “lactamase rp4 beta” OR carbenicillinase
3. S1 OR S2
4. MH "Enterobacteriaceae+" OR MH "Enterobacteriaceae Infections+"
5. (MH "Pseudomonas") OR (MH "Pseudomonas Infections")
6. Klebsiella OR eaggec OR “alkalescens-dispar group\*” OR “e coli” OR Escherichia OR Salmonella OR Proteus OR Pseudomonas OR Chryseomonas OR flavimonas OR “enteric bacteria” OR paracolobactrum OR “coliform bacilli” OR ENTEROBACTERIACEAE
7. S4 OR S5 OR S6
8. MH "Ceftriaxone"
9. Ceftriaxone OR ceftriaxon OR terbac OR rocefalin OR longacef OR rocephine OR ro 139904 OR “ro13 9904” OR lendacin OR rocephin OR “ceftriaxona andreu” OR “ro 13 9904” OR cefatriaxone OR cefaxona OR ceftriaxone OR “ro 13-9904” OR ro139904 OR ceftrex OR longaceph OR rocefin OR tacex OR benaxona OR “ceftriaxona ldp torlan”
10. MH "Cefotaxime+"
11. Cefotaxime or cephotaxim or primafen or cefotaxim or Kendrick or fotexina or biosint or "ru 24756" or klaforan or taporin or "hr 756" or benaxima or hr756 or claforan or ru24756 or cefotaxime or cefradil or cefpodoxime or "U 76253A" or "RU 51746" or "R 3746" or "R 3763"
12. MH "Ceftazidime"
13. Ceftazidime OR gr20263 OR tazidime OR ly 139381 OR ly139381 OR “gr 20263” OR fortaz OR fortum OR “ly 139381”
14. MH "Aztreonam"
15. aztreonam OR “sq 26776” OR azthreonam OR sq26776 OR azactam OR aztreonam OR urobactam OR “az threonam”
16. Cefepime OR cefepim OR Quadrocef OR Maxipime OR Axepim OR “BMY 28142”
17. S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16
18. S7 AND S17
19. S3 OR S18
20. MH "Economics+" OR MH "Costs and Cost Analysis+"
21. Economic\* or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic\* [have to use title field and also OR with the abstract field]
22. expenditure\* not energy [have to use title field and also OR with the abstract field]
23. value N1 money [search in title or abstract)
24. budget\* (Search in Title or Abstract)
25. S20 OR S21 OR S22 OR S23 OR 24
26. “Energy cost\*” OR “oxygen cost\*” OR “metabolic cost\*” OR “Energy expenditure\*” OR “oxygen expenditure\*”
27. S25 NOT S26
28. S27 AND S19

**Cochrane NHS EED** (Run on July 16, 2014 – 54 Results. Rerun on August 21, 2015, 56 results [27 post-2000].)

1. MeSH descriptor: [beta-Lactamases] explode all trees
2. ESBL or Beta-lactamase\* or Beta lactamase\* or Beta-lactam resistance or Beta lactam resistance or Cephalosporin\* or amidase cephalexin or cephalexin amidase or Penicillinase\* or Exopenicillinase or Benzylpenicillinase or lactamase rp4 beta or carbenicillinase:ti,ab,kw (Word variations have been searched)
3. #1 or #2
4. MeSH descriptor: [Klebsiella] explode all trees
5. MeSH descriptor: [Klebsiella Infections] explode all trees
6. klebsiella:ti,ab,kw (Word variations have been searched)
7. #4 or #5 or #6
8. MeSH descriptor: [Escherichia coli] explode all trees
9. MeSH descriptor: [Escherichia coli Infections] explode all trees
10. eaggec or alkalescens-dispar group\* or e coli or escherichia coli:ti,ab,kw (Word variations have been searched)
11. MeSH descriptor: [Salmonella Infections] explode all trees
12. MeSH descriptor: [Salmonella] explode all trees
13. salmonella:ti,ab,kw (Word variations have been searched)
14. MeSH descriptor: [Proteus Infections] explode all trees
15. MeSH descriptor: [Proteus] explode all trees
16. proteus:ti,ab,kw (Word variations have been searched)
17. MeSH descriptor: [Pseudomonas] explode all trees
18. MeSH descriptor: [Pseudomonas Infections] explode all trees
19. Pseudomonas or Chryseomonas or flavimonas:ti,ab,kw (Word variations have been searched)
20. MeSH descriptor: [Enterobacteriaceae Infections] explode all trees
21. MeSH descriptor: [Enterobacteriaceae] explode all trees
22. enteric bacteria or paracolobactrum or coliform bacilli or Enterobacteriaceae:ti,ab,kw (Word variations have been searched)
23. #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22
24. MeSH descriptor: [Ceftriaxone] explode all trees
25. Ceftriaxone or ceftriaxon or terbac or rocefalin or longacef or rocephine or "ro 139904" or "ro13 9904" or "ro13 9904" or lendacin or rocephin or "ceftriaxona andreu" or "ro 13 9904" or cefatriaxone or cefaxona or ceftriaxone or "ro 13 9904" or ro139904 or ceftrex or longaceph or rocefin or tacex or benaxona or "ceftriaxona ldp torlan":ti,ab,kw (Word variations have been searched)
26. MeSH descriptor: [Cefotaxime] explode all trees
27. Cefotaxime or cephotaxim or primafen or cefotaxim or Kendrick or fotexina or biosint or "ru 24756" or klaforan or taporin or "hr 756" or benaxima or hr756 or claforan or ru24756 or cefotaxime or cefradil or cefpodoxime or "U 76253A" or "RU 51746" or "R 3746" or "R 3763":ti,ab,kw (Word variations have been searched)
28. MeSH descriptor: [Ceftazidime] explode all trees
29. Ceftazidime or gr20263 or tazidime or ly 139381 or ly139381 or "gr 20263" or fortaz or fortum or "ly 139381":ti,ab,kw (Word variations have been searched)
30. #24 or #25 or #26 or #27 or #28 or #29
31. MeSH descriptor: [Aztreonam] explode all trees
32. aztreonam or "sq 26776" or azthreonam or sq26776 or azactam or aztreonam or urobactam or "az threonam":ti,ab,kw (Word variations have been searched)
33. Cefepime or cefepim or Quadrocef or Maxipime or Axepim or "BMY 28142":ti,ab,kw (Word variations have been searched)
34. #30 or #31 or #32 or #33
35. #23 and #34
36. #3 or #35

**Cochrane Economics Search** (Run on September 4, 2014, 6 CDSR, 0 DARE, 342 CENTRAL. Rerun on August 21, 2015. 5 CDSR, 2 DARE, 171 CENTRAL [post 2000])

1. MeSH descriptor: [beta-Lactamases] explode all trees 131
2. ESBL or Beta-lactamase\* or Beta lactamase\* or Beta-lactam resistance or Beta lactam resistance or Cephalosporin\* or amidase cephalexin or cephalexin amidase or Penicillinase\* or Exopenicillinase or Benzylpenicillinase or lactamase rp4 beta or carbenicillinase:ti,ab,kw (Word variations have been searched) 2476
3. #1 or #2 2476
4. MeSH descriptor: [Klebsiella] explode all trees 128
5. MeSH descriptor: [Klebsiella Infections] explode all trees 70
6. klebsiella:ti,ab,kw (Word variations have been searched) 542
7. #4 or #5 or #6 544
8. MeSH descriptor: [Escherichia coli] explode all trees 557
9. MeSH descriptor: [Escherichia coli Infections] explode all trees 341
10. eaggec or alkalescens-dispar group\* or e coli or escherichia coli:ti,ab,kw (Word variations have been searched) 2005
11. MeSH descriptor: [Salmonella Infections] explode all trees 269
12. MeSH descriptor: [Salmonella] explode all trees 192
13. salmonella:ti,ab,kw (Word variations have been searched) 425
14. MeSH descriptor: [Proteus Infections] explode all trees 51
15. MeSH descriptor: [Proteus] explode all trees 72
16. proteus:ti,ab,kw (Word variations have been searched) 305
17. MeSH descriptor: [Pseudomonas] explode all trees 358
18. MeSH descriptor: [Pseudomonas Infections] explode all trees 372
19. Pseudomonas or Chryseomonas or flavimonas:ti,ab,kw (Word variations have been searched) 1537
20. MeSH descriptor: [Enterobacteriaceae Infections] explode all trees 858
21. MeSH descriptor: [Enterobacteriaceae] explode all trees 1070
22. enteric bacteria or paracolobactrum or coliform bacilli or Enterobacteriaceae:ti,ab,kw (Word variations have been searched) 549
23. #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 4305
24. MeSH descriptor: [Ceftriaxone] explode all trees 591
25. Ceftriaxone or ceftriaxon or terbac or rocefalin or longacef or rocephine or "ro 139904" or "ro13 9904" or "ro13 9904" or lendacin or rocephin or "ceftriaxona andreu" or "ro 13 9904" or cefatriaxone or cefaxona or ceftriaxone or "ro 13 9904" or ro139904 or ceftrex or longaceph or rocefin or tacex or benaxona or "ceftriaxona ldp torlan":ti,ab,kw (Word variations have been searched) 1042
26. MeSH descriptor: [Cefotaxime] explode all trees 1609
27. Cefotaxime or cephotaxim or primafen or cefotaxim or Kendrick or fotexina or biosint or "ru 24756" or klaforan or taporin or "hr 756" or benaxima or hr756 or claforan or ru24756 or cefotaxime or cefradil or cefpodoxime or "U 76253A" or "RU 51746" or "R 3746" or "R 3763":ti,ab,kw (Word variations have been searched) 1003
28. MeSH descriptor: [Ceftazidime] explode all trees 404
29. Ceftazidime or gr20263 or tazidime or ly 139381 or ly139381 or "gr 20263" or fortaz or fortum or "ly 139381":ti,ab,kw (Word variations have been searched) 755
30. #24 or #25 or #26 or #27 or #28 or #29 3001
31. MeSH descriptor: [Aztreonam] explode all trees 142
32. aztreonam or "sq 26776" or azthreonam or sq26776 or azactam or aztreonam or urobactam or "az threonam":ti,ab,kw (Word variations have been searched) 250
33. Cefepime or cefepim or Quadrocef or Maxipime or Axepim or "BMY 28142":ti,ab,kw (Word variations have been searched) 186
34. #30 or #31 or #32 or #33 3282
35. #23 and #34 544
36. #3 or #35 2813
37. MeSH descriptor: [Economics] explode all trees
38. MeSH descriptor: [Costs and Cost Analysis] explode all trees
39. Economic\* or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic\* OR ( expenditure\* not energy)
40. value near/2 money
41. budget\*
42. #37 OR #38 OR #39 OR #40 OR #41
43. “Energy cost\*” OR “oxygen cost\*” OR “metabolic cost\*” OR “Energy expenditure\*” OR “oxygen expenditure\*”
44. #42 NOT #43
45. #36 AND #44

**Web of Science Economics Search** (Run on July 16, 2014, 833 results. Rerun on August 24, 2015, 154 results [limited to publication date 2014-present])

1. (ESBL OR “Beta lactamase\*” OR “Beta-lactam resistance” OR “Beta lactam resistance” OR Cephalosporin\* OR “amidase cephalexin” OR “cephalexin amidase” OR Penicillinase\* OR Exopenicillinase OR Benzylpenicillinase OR “lactamase rp4 beta” OR carbenicillinase)
2. (Klebsiella OR eaggec OR “alkalescens-dispar group\*” OR “e coli” OR escherichia OR Salmonella OR Proteus OR Pseudomonas OR Chryseomonas OR flavimonas OR “enteric bacteria” OR paracolobactrum OR “coliform bacilli” OR ENTEROBACTERIACEAE)
3. (Ceftriaxone OR ceftriaxon OR terbac OR rocefalin OR longacef OR rocephine OR ro 139904 OR “ro13 9904” OR lendacin OR rocephin OR “ceftriaxona andreu” OR “ro 13 9904” OR cefatriaxone OR cefaxona OR ceftriaxone OR “ro 13-9904” OR ro139904 OR ceftrex OR longaceph OR rocefin OR tacex OR benaxona OR “ceftriaxona ldp torlan” OR Cefotaxime or cephotaxim or primafen or cefotaxim or Kendrick or fotexina or biosint or "ru 24756" or klaforan or taporin or "hr 756" or benaxima or hr756 or claforan or ru24756 or cefotaxime or cefradil or cefpodoxime or "U 76253A" or "RU 51746" or "R 3746" or "R 3763" OR Ceftazidime OR gr20263 OR tazidime OR ly 139381 OR ly139381 OR “gr 20263” OR fortaz OR fortum OR “ly 139381” OR aztreonam OR “sq 26776” OR azthreonam OR sq26776 OR azactam OR aztreonam OR urobactam OR “az threonam” OR Cefepime OR cefepim OR Quadrocef OR Maxipime OR Axepim OR “BMY 28142”)
4. #2 And #3
5. #1 OR #4
6. TS=(Economic\* or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic\* OR (expenditure\* not energy) OR (value Near/2 money) OR budget\*) NOT TS=(“Energy cost\*” OR “oxygen cost\*” OR “metabolic cost\*” OR “Energy expenditure\*” OR “oxygen expenditure\*”)
7. #5 AND #6

**Scopus Economics Search** (Run on July 16, 2014, 3208 results. Rerun on August 24, 2015, 313 results.)

1. (ESBL OR “Beta lactamase\*” OR “Beta-lactam resistance” OR “Beta lactam resistance” OR Cephalosporin\* OR “amidase cephalexin” OR “cephalexin amidase” OR Penicillinase\* OR Exopenicillinase OR Benzylpenicillinase OR “lactamase rp4 beta” OR carbenicillinase)
2. (Klebsiella OR eaggec OR “alkalescens-dispar group\*” OR “e coli” OR escherichia OR Salmonella OR Proteus OR Pseudomonas OR Chryseomonas OR flavimonas OR “enteric bacteria” OR paracolobactrum OR “coliform bacilli” OR ENTEROBACTERIACEAE)
3. Ceftriaxone OR ceftriaxon OR terbac OR rocefalin OR longacef OR rocephine OR "ro 139904" OR "ro13 9904" OR lendacin OR rocephin OR "ceftriaxona andreu" OR "ro 13 9904" OR cefatriaxone OR cefaxona OR ceftriaxone OR "ro 13-9904" OR ro139904 OR ceftrex

OR

tacex OR benaxona OR "ceftriaxona ldp torlan" OR Cefotaxime or cephotaxim or primafen or cefotaxim or Kendrick or fotexina or biosint or "ru 24756" or klaforan or taporin or "hr 756" or benaxima or hr756 or claforan or ru24756 or cefotaxime or cefradil

or

"U 76253A" or "RU 51746" or "R 3746" or "R 3763" OR Ceftazidime OR gr20263 OR tazidime OR "ly 139381" OR "ly139381" OR "gr 20263" OR fortaz OR fortum OR "ly 139381" OR aztreonam OR "sq 26776" OR azthreonam OR sq26776 OR azactam OR aztreonam OR urobactam

OR

“az threonam” OR Cefepime OR cefepim OR Quadrocef OR Maxipime OR Axepim OR “BMY 28142” OR longaceph OR rocefin or cefpodoxime

1. #2 And #3
2. #1 OR #4
3. Economic\* or cost or costs or costly or costing or price or prices or pricing or pharmacoeconomic\* OR budget\* OR (expenditure\* not energy) OR (value W/2 money)

NOT

Energy cost\*” OR “oxygen cost\*” OR “metabolic cost\*” OR “Energy expenditure\*” OR “oxygen expenditure\*”

1. #5 AND #6

**Appendix 2. Risk of bias assessment using Newcastle-Ottawa toola,b**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Selection** | | | | **Comparability** | **Outcome** | | |
| **Author**  **(Year)** | **Representativeness of infected case** | **Selection of the non-infected controls** | **Ascertainment of infection** | **Outcome was not present at the beginning of study** | **Case and controls comparability** | **Assessment of outcome** | **Follow-up long enough for outcome to occurs** | **Adequacy of follow up of cohort** |
| Freeman et al.17 | \* | \* | \* | Not assessed outcome | Not assessed outcome | Not assessed outcome | Not assessed outcome | Not assessed outcome |
| Han et al.18 | \* | \* | \* | Not assessed outcome | Not assessed outcome | Not assessed outcome | Not assessed outcome | Not assessed outcome |
| Hidron et al.19 | \* | \* | \* | Not assessed outcome | Not assessed outcome | Not assessed outcome | Not assessed outcome | Not assessed outcome |
| Landman et al.20 | \* | \* | \* | Not assessed outcome | Not assessed outcome | Not assessed outcome | Not assessed outcome | Not assessed outcome |
| Larson et al.21 | \* | \* | \* | Not assessed outcome | Not assessed outcome | Not assessed outcome | Not assessed outcome | Not assessed outcome |
| Lipworth et al.22 | \* | \* | \* | Not assessed outcome | Not assessed outcome | Not assessed outcome | Not assessed outcome | Not assessed outcome |
| Soe et al.23 | \* | \* | \* | Not assessed outcome | Not assessed outcome | Not assessed outcome | Not assessed outcome | Not assessed outcome |
| Stoll et al.24 | \* | \* | \* | Not assessed outcome | Not assessed outcome | Not assessed outcome | Not assessed outcome | Not assessed outcome |
| Swami et al.25 | \* | \* | \* | Not assessed outcome | Not assessed outcome | Not assessed outcome | Not assessed outcome | Not assessed outcome |

a Receiving a star (\*) represents that the study has low risk of bias and high quality in that category

b Reference 16