Appendix C Guideline scope

NATIONAL INSTITUTE FOR HEALTH AND CLINICAL EXCELLENCE

SCOPE

1 Guideline title

Chronic kidney disease: management of hyperphosphataemia in patients with stage 4 or 5 chronic kidney disease.

1.1 Short title

Management of hyperphosphataemia.

2 The remit

The Department of Health has asked NICE: ‘To produce a short clinical guideline on management of hyperphosphataemia in patients with stage 4 or 5 chronic kidney disease.

3 Clinical need for the guideline

3.1 Epidemiology

a) For 2009, the Health Survey for England reported an overall prevalence of moderate to severe CKD (stages 3 to 5) of 6%; CKD stages 4 and 5 were reported at a prevalence of less than 1%. In the same year, the UK Renal Registry reported that 49,080 adult patients were receiving renal replacement therapy (RRT) in the UK. Of these patients, 25,796 were receiving RRT in the form of dialysis.

b) The most recent Renal Registry data from 2009 showed that only 61% of patients receiving haemodialysis and 70% of patients...
receiving peritoneal dialysis achieved serum phosphate levels within the recommended range.

c) Inadequate control of serum phosphate can directly and indirectly increase parathyroid hormone secretion, leading to the development of secondary hyperparathyroidism. Left untreated, secondary hyperparathyroidism increases morbidity and mortality and may lead to renal bone disease, with patients experiencing bone and muscular pain, increased incidence of fracture, abnormalities of bone and joint morphology, and vascular and soft tissue calcification.

d) An ageing population together with an increasing incidence of diabetes and better survival means that the number of patients requiring dialysis and adequate phosphate management is increasing. Between 2005 and 2009 the number of patients needing dialysis increased at a rate of 3.5% per year.

3.2 Current practice

a) For adult patients with stage 3 to 5 chronic kidney disease who are not on dialysis, the UK Renal Association clinical practice guideline recommends that serum phosphate levels be maintained between 0.9 and 1.5 mmol/l. For adult patients with stage 5 chronic kidney disease who are on dialysis, it is recommended that serum phosphate levels be maintained between 1.1 and 1.7 mmol/l.

b) For patients under 20 years of age, with stage 1 to 4 chronic kidney disease, the National Kidney Foundation's Kidney Disease Outcomes Quality Initiative recommends serum phosphate levels be maintained within age-appropriate limits. For those with stage 5 chronic kidney disease, including those on dialysis, it is recommended that serum phosphate levels be maintained between 1.3 and 1.9 mmol/l for those aged 1 to 12 years, and between 1.1 and 1.8 mmol/l during adolescence.
c) Standard management of stage 4 and 5 chronic kidney disease involves maintaining acceptable levels of phosphate, calcium and parathyroid hormone. This can be achieved by the use of phosphate binding agents, calcium supplementation, dietary management of phosphate, vitamin D preparations, calcimimetics or parathyroidectomy.

d) There is wide variation in the management of serum phosphate levels between renal centres in the UK. This, together with a rising prevalence of CKD and a growing number of people receiving dialysis, requires the development of a clinical guideline on the management of hyperphosphataemia.

4 The guideline

The guideline development process is described in detail on the NICE website (see section 6, ‘Further information’).

This scope defines what the guideline will (and will not) examine, and what the guideline developers will consider. The scope is based on the referral from the Department of Health.

The areas that will be addressed by the guideline are described in the following sections.

4.1 Population

4.1.1 Groups that will be covered

a) Adults, children and young people with stage 4 or 5 chronic kidney disease who are not on dialysis and who are at risk of hyperphosphataemia.

b) Adults, children and young people with stage 5 chronic kidney disease who are receiving haemodialysis or peritoneal dialysis and are at risk of hyperphosphataemia.
c) Consideration will also be given to specific subgroups, as appropriate and when these have been reported by study authors.

4.1.2 Groups that will not be covered

a) Adults, children and young people with stage 1–3 kidney disease.

4.2 Healthcare setting

a) All healthcare settings, and at home.

4.3 Clinical management

4.3.1 Key clinical issues that will be covered

a) Treatments for managing hyperphosphataemia including:

- phosphate binders (including sevelamer hydrochloride, sevelamer carbonate, lanthanum carbonate, calcium-based phosphate binders (including calcium carbonate and calcium acetate), magnesium/calcium carbonate combinations (including magnesium carbonate/calcium acetate combinations), aluminium-based phosphate binders (including aluminium hydroxide)
- prescribed supplements (such as calcium and nicotinamide)
- dietary management of phosphate.

b) Efficacy of patient information/education in respect of adherence to dietary interventions.

c) The sequencing of treatments (diet, phosphate binders, vitamin D and dialysis) to effectively manage hyperphosphataemia.

4.3.2 Clinical issues that will not be covered

a) Diagnosing hyperphosphataemia.

b) Diagnosing and managing hyperparathyroidism.
c) Diagnosing and managing renal bone disease.

d) Primary management of chronic metabolic acidosis, except as a consequence of treating hyperphosphataemia.

e) Primary management of hypophosphataemia, except as a consequence of treating hyperphosphataemia.

f) Treatments with the primary aim of increasing bone density.

g) Efficacy of choice/Type of dialysis, including extending dialysis duration, and changing dialysis membranes and fluids.

h) Efficacy of Vitamin D and its analogues.

i) Prognostic value of serum phosphate level and other biochemical markers, except when considered in the context of specified therapeutic intervention(s).

4.4 Main outcomes

a) Management of serum phosphate.

b) Morbidity, including fractures, advancement of renal bone disease, vascular calcification, cardiovascular impact, and other related issues.

c) Adverse effects of therapy, immediate and long term.

d) Cardiovascular-related mortality.

e) Overall mortality.

f) For people not already receiving renal replacement therapy, effect of therapy on requirement for renal replacement therapy.

g) Health-related quality of life.

h) Resource use and costs.
4.5  Economic aspects

Developers will take into account both clinical and cost effectiveness when making recommendations involving a choice between alternative interventions. A review of the economic evidence will be conducted and analyses will be carried out as appropriate. The preferred unit of effectiveness is the quality-adjusted life year (QALY), and the costs considered will usually only be from an NHS and personal social services (PSS) perspective. Further detail on the methods can be found in 'The guidelines manual' (see 'Further information').

4.6  Status

4.6.1  Scope

This is the final scope.

4.6.2  Timing

The development of the guideline recommendations will begin in January 2012.

5  Related NICE guidance

5.1  Published guidance

5.1.1  Other related NICE guidance

6 Further information

Information on the guideline development process is provided in:

- ‘How NICE clinical guidelines are developed: an overview for stakeholders the public and the NHS’.
- ‘The guidelines manual’.

These are available from the NICE website (www.nice.org.uk/guidelinesmanual). Information on the progress of the guideline will also be available from the NICE website (www.nice.org.uk).
Appendix D How this guideline was developed

This guideline was developed in accordance with the process for short clinical guidelines set out in 'The guidelines manual' (2009). There is more information about how NICE clinical guidelines are developed on the NICE website. A booklet, 'How NICE clinical guidelines are developed: an overview for stakeholders, the public and the NHS' is available.

Search strategies

The evidence reviews used to develop the guideline recommendations were underpinned by systematic literature searches, following the methods described in 'The guidelines manual' (2009). The aim of the systematic searches was to comprehensively identify the published evidence to answer the review questions developed by the Guideline Development Group and Short Clinical Guidelines Technical Team.

The search strategies for the review questions were developed by the Information Services Team with advice from the Short Clinical Guidelines Technical Team. Structured questions were developed using the PICO (population, intervention, comparison, outcome) model and translated into search strategies using subject heading and free text terms. The strategies were run across a number of databases with no date restrictions imposed on the searches.

The NHS Economic Evaluation Database (NHS EED) and the Health Economic Evaluations Database (HEED) were searched for economic evaluations. Search filters for economic evaluations and quality of life studies were used on bibliographic databases. There were no date restrictions imposed on the searches.

Guideline Development Group members were also asked to alert the Short Clinical Guidelines Technical Team to any additional evidence, published, unpublished or in press, that met the inclusion criteria.

The searches were undertaken between October 2011 and March 2012.
**Scoping searches**

Scoping searches were undertaken using the following websites and databases (listed in alphabetical order) between May and June 2011; browsing or simple search strategies were employed. The search results were used to provide information for scope development and project planning.

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<tr>
<th>Guidelines/websites</th>
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<td>Scottish Intercollegiate Guidelines Network (SIGN)</td>
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**Main searches**

The following sources were searched for the topics presented in the sections below.

- Cochrane Database of Systematic Reviews – CDSR (Wiley)
- Cochrane Central Register of Controlled Trials – CENTRAL (Wiley)
- Database of Abstracts of Reviews of Effects – DARE (Wiley and CRD website)
- EMBASE (Ovid)
- Health Technology Assessment Database – HTA (Wiley and CRD website)
- MEDLINE (Ovid)
- MEDLINE In-Process (Ovid)

**Systematic reviews and mapping searches**

The first search was conducted in October 2011 and looked for systematic reviews and primary studies (the ‘mapping search’ with no methodological filter applied) to answer questions about which dietary methods are most effective.

The MEDLINE search strategies are presented below. They were translated for use in each of the other databases.

Ovid MEDLINE(R) <1950 to 18 October 2011>

1. exp Renal Insufficiency, Chronic/
2. ckd.tw.
3. ((chronic or progress*) adj1 kidney disease*).tw.
4. ((chronic or progress*) adj1 renal disease*).tw.
5. ((chronic or progress*) adj1 kidney failure).tw.
6. ((chronic or progress*) adj1 renal failure).tw.
7. end-stage kidney.tw.
8. end-stage renal.tw.
9. ((renal or kidney*) adj3 insufficien*).tw.
10. or/1-9
11. exp Renal Dialysis/
12. ((renal or peritoneal or kidney*) adj3 dialys*).tw.
13. (haemodialys* or hemodialys*).tw.
14. or/11-13
15. Diet Therapy/
16. Phosphorus, Dietary/
17. Dietary Proteins/
18. diet, protein-restricted/
19. ((phosph* or protein*) adj3 (limit* or restrict* or reduc* or low* or intake or control*)).tw.
20. (diet* adj3 regime*).tw.
21. or/15-20
22. 10 or 14
23. 21 and 22
24. Animals/ not Humans/
25. 23 not 24
26. limit 25 to english language
28. Meta-Analysis as Topic/
29. Review.pt.
30. exp Review Literature as Topic/
31. (metaanaly$ or metanaly$ or (meta adj2 analy$)).tw.
32. (review$ or overview$).ti.
33. (systematic$ adj4 (review$ or overview$)).tw.
34. ((quantitative$ or qualitative$) adj4 (review$ or overview$)).tw.
35. ((studies or trial$) adj1 (review$ or overview$)).tw.
36. (integrat$ adj2 (research or review$ or literature)).tw.
37. (pool$ adj1 (analy$ or data)).tw.
38. (handsearch$ or (hand adj2 search$)).tw.
40. or/27-39
41. Randomized Controlled Trial.pt.
42. Controlled Clinical Trial.pt.
43. Clinical Trial.pt.
44. exp Clinical Trials as Topic/
The second search was conducted in October 2011 and looked for systematic reviews and primary studies (the ‘mapping search’ with no methodological filter applied) to answer questions about which are the most effective phosphate binders.

The MEDLINE search strategies are presented below. They were translated for use in each of the other databases.

Ovid MEDLINE(R) <1950 to 21 October 2011>

1. exp Renal Insufficiency, Chronic/
2. ckd.tw.
3. ((chronic or progress*) adj1 kidney disease*).tw.
4. ((chronic or progress*) adj1 renal disease*).tw.
5. ((chronic or progress*) adj1 kidney failure).tw.
6. ((chronic or progress*) adj1 renal failure).tw.
7. end-stage kidney.tw.
8. end-stage renal.tw.
9. ((renal or kidney*) adj3 insufficien*).tw.
10. or/1-9
11. exp Renal Dialysis/
12. ((renal or peritoneal or kidney) adj3 dialys*).tw.
13. (haemodialys* or hemodialys*).tw.
14. or/11-13
15. (phosph* adj3 bind*).tw.
16. (sevelamer or lanthanum).tw.
17. Calcium Carbonate/
18. (calcium adj3 (carbonate* or acetate* or alginate* or ketoglutarate*)).tw.
19. magnesium carbonate*.tw.
20. Aluminum Hydroxide/
22. iron-magnesium hydroxycarbonate*.tw.
23. ferric citrate*.tw.
24. colestimide*.tw.
25. Sucralfate/
26. sucralfate*.tw.
27. Chitosan/
28. chitosan*.tw.
29. or/15-28
30. 10 or 14
31. 29 and 30
32. animals/ not Humans/
33. 31 not 32
34. limit 33 to english language
36. Meta-Analysis as Topic/
37. Review.pt.
38. exp Review Literature as Topic/
39. (metaanaly$ or metanaly$ or (meta adj2 analy$)).tw.
40. (review$ or overview$).ti.
41. (systematic$ adj4 (review$ or overview$)).tw.
42. ((quantitative$ or qualitative$) adj4 (review$ or overview$)).tw.
43. ((studies or trial$) adj1 (review$ or overview$)).tw.
44. (integrat$ adj2 (research or review$ or literature)).tw.
The third search was conducted in November 2011 and looked for systematic reviews and primary studies (the ‘mapping search’ with no methodological filter applied) to answer questions about which are the most effective supplements.

The MEDLINE search strategies are presented below. They were translated for use in each of the other databases.

Ovid MEDLINE(R) <1950 to 2 November 2011>

1. exp Renal Insufficiency, Chronic/
2. ckd.tw.
3. ((chronic or progress*) adj1 kidney disease*).tw.
4. ((chronic or progress*) adj1 renal disease*).tw.
5. ((chronic or progress*) adj1 kidney failure).tw.
6. ((chronic or progress*) adj1 renal failure).tw.
7. (end-stage kidney or endstage kidney or end stage kidney).tw.
8. (end-stage renal or endstage renal or end stage renal).tw.
9. ((renal or kidney*) adj3 insufficien*).tw.
10. or/1-9
11. exp Renal Dialysis/
12. ((renal or peritoneal or kidney*) adj3 dialys*).tw.
13. (haemodialys* or hemodialys*).tw.
14. or/11-13
15. Dietary Supplements/
16. ((diet* or food* or nutrition*) adj3 supplement*).tw.
17. Vitamins/
18. Minerals/
19. Calcium, Dietary/
20. Niacinamide/
21. exp Folic Acid/
22. ((Nicotina* or niacin* or Vitamin* or folic or Mineral* or Fola* or (calcium adj3 diet*)) not vitamin d).tw.
23. or/15-22
24. 10 or 14
25. 23 and 24
26. Animals/ not Humans/
27. 25 not 26
28. limit 27 to english language
30. Meta-Analysis as Topic/
32. exp Review Literature as Topic/
33. (metaanaly$ or metanaly$ or (meta adj2 analy$)).tw.
34. (review$ or overview$).ti.
35. (systematic$ adj4 (review$ or overview$)).tw.
36. ((quantitative$ or qualitative$) adj4 (review$ or overview$)).tw.
37. ((studies or trial$) adj1 (review$ or overview$)).tw.
38. (integrat$ adj2 (research or review$ or literature)).tw.
39. (pool$ adj1 (analy$ or data)).tw.
40. (handsearch$ or (hand adj2 search$)).tw.
41. (manual$ adj2 search$).tw.
42. or/29-41
43. Randomized Controlled Trial.pt.
44. Controlled Clinical Trial.pt.
45. Clinical Trial.pt.
46. exp Clinical Trials as Topic/
47. Placebos/
48. Random Allocation/
49. Double-Blind Method/
50. Single-Blind Method/
51. Cross-Over Studies/
52. ((random$ or control$ or clinical$) adj2 (trial$ or stud$)).tw.
54. placebo$.tw.
55. ((singl$ or doubl$ or trebl$ or tripl$) adj (blind$ or mask$)).tw.
56. (crossover$ or (cross adj over$)).tw.
57. or/43-56
58. 42 or 57)
59. 28 and 58

The fourth search was conducted in November 2011 and looked for systematic reviews and primary studies (the ‘mapping search’ with no methodological filter applied) to answer the question about what order should available treatments be considered.

The MEDLINE search strategies are presented below. They were translated for use in each of the other databases.

Ovid MEDLINE(R) <1950 to 15 November 2011>
The patient information search was conducted in October 2011 and was formulated to answer the question about which information strategies are most effective.

**Ovid MEDLINE(R) <1950 to October 2011>**

1. exp Renal Insufficiency, Chronic/
2. ckd.tw.
3. ((chronic or progress*) adj1 kidney disease*).tw.
4. ((chronic or progress*) adj1 renal disease*).tw.
5. ((chronic or progress*) adj1 kidney failure).tw.
6. ((chronic or progress*) adj1 renal failure).tw.
7. (end-stage kidney or endstage kidney or end stage kidney).tw.
8. (end-stage renal or endstage renal or end stage renal).tw.
9. ((renal or kidney*) adj3 insufficien*).tw.
10. or/1-9
11. exp Renal Dialysis/
12. ((renal or peritoneal or kidney*) adj3 dialys*).tw.
13. (haemodialys* or hemodialys*).tw.
14. or/11-13
15. 10 or 14
16. Hyperphosphatemia/
17. hyperphosphat*.tw.
18. or/16-17
19. 15 and 18
20. animals/ not humans/
21. 19 not 20
22. limit 21 to english language
6. ((chronic or progress*) adj1 renal failure).tw.
7. (end-stage kidney or endstage kidney or end stage kidney).tw.
8. (end-stage renal or endstage renal or and stage renal).tw.
9. ((renal or kidney*) adj3 insufficien*).tw.
10. or/1-9
11. exp Renal Dialysis/
12. ((renal or peritoneal or kidney*) adj3 dialys*).tw.
13. (haemodialys* or hemodialys*).tw.
14. or/11-13
15. Diet Therapy/
16. Phosphorus, Dietary/
17. Dietary Proteins/
18. diet, protein-restricted/
19. ((phosph* or protein*) adj3 (limit* or restrict* or reduc* or low* or intake or control*)).tw.
20. (diet* adj3 regime*).tw.
21. or/15-20
22. 10 or 14
23. 21 and 22
24. Animals/ not Humans/
25. 23 not 24
26. limit 25 to english language
27. Qualitative Research/
28. Nursing Methodology Research/
29. exp Interviews as topic/
30. Questionnaires/
31. Narration/
32. Health Care Surveys/
33. (qualitative$ or interview$ or focus group$ or questionnaire$ or narrative$ or narration$ or survey$).tw.
34. (ethno$ or emic or etic or phenomenolog$ or grounded theory or constant compar$ or (thematic$ adj3 analys$) or theoretical sampl$ or purposive sampl$).tw.
35. (hermeneutic$ or heidegger$ or husserl$ or colaizzi$ or van kaam$ or van manen$ or giorgi$ or glaser$ or strauss$ or ricoeur$ or spiegelberg$ or merleau$).tw.
36. (metasynthes$ or meta-synthes$ or metasummar$ or meta-summar$ or metastud$ or meta-stud$ or metathem$ or meta-them$).tw.
37. or/27-36
38. exp Patients/px
39. exp Family/px
40. Caregivers/px
41. ((patient$ or parent$ or famil$ or relative$ or carer$ or caregiver$ or care-giver$ or spous$ or husband$ or wife$ or wive$ or partner$ or mother$ or father$ or sibling$ or sister$ or brother$) adj5 (experience$ or belief$ or stress$ or emotion$ or anx$ or fear$ or concern$ or uncertain$ or unsure or thought$ or feeling$ or felt$ or view$ or opinion$ or perception$ or perspective$ or attitud$ or satisfact$ or know$ or understand$ or aware$)).ti.
42. Stress, Psychological/
43. Adaptation, psychological/
44. Emotions/
45. Anxiety/
46. Fear/
47. exp Consumer Satisfaction/
48. or/38-47
49. exp Patients/
50. exp Family/
51. Caregivers/
52. (patient$ or parent$ or famil$ or relative$ or carer$ or caregiver$ or care-giver$ or spous$ or husband$ or wife$ or wive$ or partner$ or mother$ or father$ or sibling$ or sister$ or brother$).ti.
53. or/49-52
54. Pamphlets/
55. Needs Assessment/
56. Information Centers/
57. Information Services/
Economic searches

The following sources were searched to identify economic evaluations and quality of life data featuring the population of patients with stage 4 or 5 CKD who are hyperphosphataemic.

- NHS Economic Evaluation Database – NHS EED (Wiley and CRD website)
- Health Economic Evaluations Database – HEED (Wiley)
- Embase (Ovid)
The first economic search was conducted in December 2011 to identify economic evaluations and quality of life data for reviews questions about which dietary methods and information strategies are most effective.

Ovid MEDLINE(R) <1950 to 7 December 2011>

1. exp Renal Insufficiency, Chronic/
2. ckd.tw.
3. ((chronic or progress*) adj1 kidney disease*).tw.
4. ((chronic or progress*) adj1 renal disease*).tw.
5. ((chronic or progress*) adj1 kidney failure).tw.
6. ((chronic or progress*) adj1 renal failure).tw.
7. end-stage kidney.tw.
8. end-stage renal.tw.
9. ((renal or kidney*) adj3 insufficien*).tw.
10. or/1-9
11. exp Renal Dialysis/
12. ((renal or peritoneal or kidney*) adj3 dialys*).tw.
13. (haemodialys* or hemodialys*).tw.
14. or/11-13
15. Diet Therapy/
16. Phosphorus, Dietary/
17. Dietary Proteins/
18. diet, protein-restricted/
19. ((phosph* or protein*) adj3 (limit* or restrict* or reduc* or low* or intake or control*)).tw.
20. (diet* adj3 regime*).tw.
21. or/15-20
22. 10 or 14
23. 21 and 22
24. Animals/ not Humans/
25. 23 not 24
26. limit 25 to english language

The second economic search was conducted in December 2011 to identify economic evaluations and quality of life data for reviews questions about which phosphate binders are most effective.

Ovid MEDLINE(R) <1950 to 7 December 2011>

1. exp Renal Insufficiency, Chronic/
2. ckd.tw.
3. ((chronic or progress*) adj1 kidney disease*).tw.
4. ((chronic or progress*) adj1 renal disease*).tw.
5. ((chronic or progress*) adj1 kidney failure).tw.
6. ((chronic or progress*) adj1 renal failure).tw.
7. end-stage kidney.tw.
8. end-stage renal.tw.
9. ((renal or kidney*) adj3 insufficien*).tw.
10. or/1-9
11. exp Renal Dialysis/
12. ((renal or peritoneal or kidney) adj3 dialys*).tw.
13. (haemodialys* or hemodialys*).tw.
14. or/11-13
15. (phosph* adj3 bind*).tw.
16. (sevelamer or lanthanum).tw.
17. Calcium Carbonate/
18. (calcium adj3 (carbonate* or acetate* or alginate* or ketoglutarate*)).tw.
19. magnesium carbonate*.tw.
20. Aluminum Hydroxide/
22. iron-magnesium hydroxycarbonate*.tw.
23. ferric citrate*.tw.
24. colestimide*.tw.
25. Sucralfate/
The third economic search was conducted in December 2011 to identify economic evaluations and quality of life data for reviews questions about which supplements are most effective.

Ovid MEDLINE(R) <1950 to 8 December 2011>

1. exp Renal Insufficiency, Chronic/
2. ckd.tw.
3. ((chronic or progress*) adj1 kidney disease*).tw.
4. ((chronic or progress*) adj1 renal disease*).tw.
5. ((chronic or progress*) adj1 kidney failure).tw.
6. ((chronic or progress*) adj1 renal failure).tw.
7. (end-stage kidney or endstage kidney or end stage kidney).tw.
8. (end-stage renal or endstage renal or end stage renal).tw.
9. ((renal or kidney*) adj3 insufficien*).tw.
10. or/1-9
11. exp Renal Dialysis/
12. ((renal or peritoneal or kidney*) adj3 dialys*).tw.
13. (haemodialys* or hemodialys*).tw.
14. or/11-13
15. Dietary Supplements/
16. ((diet* or food* or nutrition*) adj3 supplement*).tw.
17. Vitamins/
18. Minerals/

sucralfate*.tw.
Chitosan/
chitosan*.tw.
or/15-28
10 or 14
29 and 30
animals/ not Humans/
31 not 32
limit 33 to english language
19. Calcium, Dietary/
20. Niacinamide/
21. exp Folic Acid/
22. ((Nicotina* or niacin* or Vitamin* or folic or Mineral* or Fola* or (calcium adj3 diet*)) not vitamin d).tw.
23. or/15-22
24. 10 or 14
25. 23 and 24
26. Animals/ not Humans/
27. 25 not 26
28. limit 27 to english language

The fourth economic search was conducted in December 2011 to identify economic evaluations and quality of life data for the review question about what order should available treatments be considered.

Ovid MEDLINE(R) <1950 to 9 December 2011>

1. exp Renal Insufficiency, Chronic/
2. ckd.tw.
3. ((chronic or progress*) adj1 kidney disease*).tw.
4. ((chronic or progress*) adj1 renal disease*).tw.
5. ((chronic or progress*) adj1 kidney failure).tw.
6. ((chronic or progress*) adj1 renal failure).tw.
7. (end-stage kidney or endstage kidney or end stage kidney).tw.
8. (end-stage renal or endstage renal or end stage renal).tw.
9. ((renal or kidney*) adj3 insufficien*).tw.
10. or/1-9
11. exp Renal Dialysis/
12. ((renal or peritoneal or kidney*) adj3 dialys*).tw.
13. (haemodialys* or hemodialys*).tw.
14. or/11-13
15. 10 or 14
16. Hyperphosphatemia/
17. hyperphoshat*.tw.
18. or/16-17
19. 15 and 18
20. animals/ not humans/
21. 19 not 20
22. limit 21 to english language

**Health economics and quality of life methodological search filters**

The MEDLINE economic evaluations and quality of life search filters are presented below. They were translated for use in the MEDLINE In-Process and Embase databases.

**Economic evaluations**

1. Economics/
2. exp "Costs and Cost Analysis"/
3. Economics, Dental/
4. exp Economics, Hospital/
5. exp Economics, Medical/
6. Economics, Nursing/
7. Economics, Pharmaceutical/
8. Budgets/
9. exp Models, Economic/
10. Markov Chains/
11. Monte Carlo Method/
12. Decision Trees/
13. econom$.tw.
14. cba.tw.
15. cea.tw.
16. cua.tw.
17. markov$.tw.
18. (monte adj carlo).tw.
19. (decision adj2 (tree$ or analys$)).tw.
20. (cost or costs or costing$ or costly or costed).tw.
21. (price$ or pricing$).tw.
Quality of life

1. "Quality of Life"/
2. quality of life.tw.
3. "Value of Life"/
4. Quality-Adjusted Life Years/
5. quality adjusted life.tw.
6. (qaly$ or qald$ or qale$ or qtime$).tw.
7. disability adjusted life.tw.
8. daly$.tw.
9. Health Status Indicators/
10. (sf36 or sf 36 or short form 36 or shortform 36 or sf thirty six or sf thirty six or shortform thirtysix or shortform thirty six or short form thirtysix or short form thirty six).tw.
11. (sf6 or sf 6 or short form 6 or shortform 6 or sf six or sfsix or shortform six or short form six).tw.
12. (sf12 or sf 12 or short form 12 or shortform 12 or sf twelve or sftwelve or shortform twelve or short form twelve).tw.
13. (sf16 or sf 16 or short form 16 or shortform 16 or sf sixteen or sfsixteen or shortform sixteen or short form sixteen).tw.
14. (sf20 or sf 20 or short form 20 or shortform 20 or sf twenty or sftwenty or shortform twenty or short form twenty).tw.
15. (euroqol or euro qol or eq5d or eq 5d).tw.
16. (qol or hql or hqol or hrqol).tw.
17. (hye or hyes).tw.
18. health$ year$ equivalent$.tw.
19. utilit$.tw.
20. (hui or hui1 or hui2 or hui3).tw.
21. disutili$.tw.
22. rosser.tw.
23. quality of wellbeing.tw.
24. quality of well-being.tw.
25. qwb.tw.
26. willingness to pay.tw.
27. standard gamble$.tw.
28. time trade off.tw.
29. time tradeoff.tw.
30. tto.tw.
31. or/1-30

Additional searches were also conducted to inform a review of the economic evidence on prognosis and parathyroidectomy

Identification of health economics and quality of life studies on prognosis

The following sources were searched:

- EMBASE (Ovid)
- MEDLINE (Ovid)
- MEDLINE In-Process (Ovid)

The MEDLINE search strategies are presented below. They were translated for use in each of the other databases.

Ovid MEDLINE(R)

1. exp Renal Insufficiency, Chronic/
2. ckd.tw.
3. ((chronic or progress*) adj1 kidney disease*).tw.
4. ((chronic or progress*) adj1 renal disease*).tw.
5. ((chronic or progress*) adj1 kidney failure).tw.
6. ((chronic or progress*) adj1 renal failure).tw.
7. (end-stage kidney or endstage kidney or end stage kidney).tw.
8. (end-stage renal or endstage renal or end stage renal).tw.
9. ((renal or kidney*) adj3 insufficien*).tw.
10. or/1-9
11. exp Renal Dialysis/
12. ((renal or peritoneal or kidney*) adj3 dialys*).tw.
13. (haemodialys* or hemodialys*).tw.
14. or/11-13
15. 10 or 14
16. Hyperphosphatemia/
17. hyperphosphat*.tw.
18. Phosphates/
19. (phosphate* or phosphorus).tw.
20. or/16-19
21. exp risk/
22. exp Regression Analysis/
23. hazard ratio*.tw.
24. (proportional adj3 hazard*).tw.
25. (relative adj3 risk).tw.
26. (cox adj3 model*).tw.
27. (regression or survival).tw.
28. exp Survival Analysis/
29. Prognosis/
30. prognos*.tw.
31. or/21-30
32. exp Mortality/
33. mortality.tw.
34. exp Cardiovascular Diseases/mo [Mortality]
35. Death, Sudden, Cardiac/
36. Coronary Artery Disease/
37. ((Cardiovascular or cv* or cardiac or heart or valvular or coronary) adj3
disease* or event* or death*).tw.
38. (myocardial infarction* or MI or heart attack*).tw.
39. exp Vascular Calcification/
40. (vascular adj3 calcificat*).tw.
Identification of health economics and quality of life studies on Pariathyroidectomy
The following sources were searched:

- EMBASE (Ovid)
- MEDLINE (Ovid)
- MEDLINE In-Process (Ovid)

The MEDLINE search strategies are presented below. They were translated for use in each of the other databases.

Ovid MEDLINE(R)

1. exp Renal Insufficiency, Chronic/
2. ckd.tw.
3. ((chronic or progress*) adj1 kidney disease*).tw.
4. ((chronic or progress*) adj1 renal disease*).tw.
5. ((chronic or progress*) adj1 kidney failure).tw.
6. ((chronic or progress*) adj1 renal failure).tw.
7. (end-stage kidney or endstage kidney or end stage kidney).tw.
8. (end-stage renal or endstage renal or end stage renal).tw.
9. ((renal or kidney*) adj3 insufficien*).tw.
10. or/1-9
11. exp Renal Dialysis/
| 12. | ((renal or peritoneal or kidney*) adj3 dialys*).tw. |
| 13. | (haemodialys* or hemodialys*).tw. |
| 14. | or/11-13 |
| 15. | 10 or 14 |
| 16. | Hyperphosphatemia/ |
| 17. | hyperphosphat*.tw. |
| 18. | Phosphates/ |
| 19. | (phosphate* or phosphorus).tw. |
| 20. | or/16-19 |
| 21. | exp risk/ |
| 22. | exp Regression Analysis/ |
| 23. | hazard ratio*.tw. |
| 24. | (proportional adj3 hazard*).tw. |
| 25. | (relative adj3 risk).tw. |
| 26. | (cox adj3 model*).tw. |
| 27. | (regression or survival).tw. |
| 28. | exp Survival Analysis/ |
| 29. | Prognosis/ |
| 30. | prognos*.tw. |
| 31. | or/21-30 |
| 32. | Parathyroidectomy/ |
| 33. | parathyroidectom*.tw. |
| 34. | or/32-33 |
| 35. | parathyroid glands/ |
| 36. | parathyroid*.tw. |
| 37. | 35 or 36 |
| 38. | Endocrine Surgical Procedures/ |
| 39. | General Surgery/ |
| 40. | Surgical Procedures, Operative/ |
| 41. | Surgical Procedures, Minimally Invasive/ |
| 42. | (remov* or surg* or excis* or dissect* or endoscop* or laparoscop*).tw. |
| 43. | or/38-42 |
| 44. | 37 and 43 |
| 45. | 34 or 44 |
46. 15 and 20 and 31 and 45
47. Animals/ not Humans/
48. 46 not 47
49. limit 48 to english language
Review questions and review protocols

Review questions

- Review question 1: For people with stage 4 or 5 chronic kidney disease who are not on dialysis, is the dietary management of phosphate effective compared to placebo or other treatments in managing serum phosphate and its associated outcomes? Which dietary methods are most effective?
- Review question 2: For people with stage 4 or 5 chronic kidney disease who are not on dialysis, are phosphate binders effective compared to placebo or other treatments in managing serum phosphate and its associated outcomes? Which is the most effective phosphate binder?
- Review question 3: For people with stage 5 chronic kidney disease who are on dialysis, is the dietary management of phosphate effective in managing serum phosphate and its associated outcomes compared to placebo or other treatments? Which dietary methods are most effective?
- Review question 4: For people with stage 5 chronic kidney disease who are on dialysis, are phosphate binders effective compared to placebo or other treatments in managing serum phosphate and its associated outcomes? Which is the most effective phosphate binder?
- Review question 5: For people with stage 4 or 5 chronic kidney disease, both those on dialysis and those who are not, are patient information strategies effective at promoting adherence to phosphate-lowering dietary interventions, or in the management of serum phosphate and its associated outcomes? Which patient information strategies are most effective?
- Review question 6: For people with stage 4 or 5 chronic kidney disease, who are not on dialysis, are prescribed supplements, alone or in conjunction with other interventions, effective compared to placebo or other treatments, in managing serum phosphate and its associated outcomes? Which are the most effective supplements?
- Review question 7: For people with stage 5 chronic kidney disease who are on dialysis, are prescribed supplements, alone or in conjunction with other interventions, effective compared to placebo or other treatments in
managing serum phosphate and its associated outcomes? Which is the most effective prescribed supplement?

- Review question 8: In the management of hyperphosphataemia in people with stage 4 or 5 chronic kidney disease, in what order should available treatments be considered? What are the clinical indications for commencing each?
## Review protocols

<table>
<thead>
<tr>
<th>Details</th>
<th>Additional comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Review question 1</strong></td>
<td>For people with stage 4 or 5 chronic kidney disease who are not on dialysis, is the dietary management of phosphate effective compared to placebo or other treatments in managing serum phosphate and its associated outcomes? Which dietary methods are most effective?</td>
</tr>
</tbody>
</table>
| **Objectives**                                                         | To establish whether the control of diet is effective in managing serum phosphate and its associated outcomes in patients with CKD 4 or 5 who are not on dialysis.  
To determine whether there is variation between dietary methods in terms of adherence to the diet.  
To determine if specific diets are more effective than others. |
| **Language**                                                           | English                                                                               |
| **Study design**                                                       | RCTs, quasi-RCTs, systematic reviews                                                  |
| **Status**                                                             | Published papers (full text only)                                                     |
| **Population**                                                         | People (no age restriction) with a diagnosis of stage 4 or 5 CKD, but not on dialysis. |
| **Intervention**                                                       | Dietary management of phosphate                                                      |
| **Comparator**                                                         | Other diets or ‘normal’ diet                                                          |
| **Outcomes**                                                           | Serum Phosphate  
Need for additional phosphate management  
Adherence to treatment  
Adverse effects  
Serum PTH |
| **Other criteria for inclusion / exclusion of studies**                | **Include**  
Papers comparing differing diets against each other or against standard diets  
Relevant surrogate markers (serum PTH)  
People with a GFR (or other valid measure of renal function) that equates to CKD 4 or 5  
Protein restriction, phosphate restriction, keto acids, amino acids  
Cross over studies if initial allocation was random  
**Exclude**  
People with CKD disease stages 1 to 3  
People on dialysis |
| **Search strategies**                                                  | RCTs, quasi-RCTs, systematic reviews                                                  |
| **Review strategies**                                                  | The NICE methodology checklist for RCTs will be used as a guide to appraise the quality of individual studies  
Data on all included studies will be extracted into evidence tables  
Where statistically possible, a meta-analytical approach will be used to give an overall summary effect  
All key outcomes from evidence will be presented in GRADE profiles or modified profiles and further |

NICE clinical guideline 157 – hyperphosphataemia in chronic kidney disease (appendices C and D)
summarized in evidence statements
Where a randomised crossover study is included, the
data from the first treatment phase only will be extracted
Sub-group analysis will be undertaken for children where appropriate
Sub group analysis for those with diabetic nephropathy
will be undertaken where appropriate.
Sub group analysis by CKD stage will be undertaken
where appropriate.

<table>
<thead>
<tr>
<th>Systematic reviews</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modification of Diet in Renal Disease (MDRD) Study</td>
</tr>
<tr>
<td>European Study Group of Nutritional Treatment of Chronic Renal Failure in Childhood</td>
</tr>
</tbody>
</table>
### Review question 2

For people with stage 4 or 5 chronic kidney disease who are not on dialysis, are phosphate binders effective compared to placebo or other treatments in managing serum phosphate and its associated outcomes? Which is the most effective phosphate binder?

### Objectives

To determine whether phosphate binders are effective in controlling serum phosphate and preventing the associated outcomes in stage 4 and 5 CKD patients who are not on dialysis.

To determine which binder is most effective.

### Language

English

### Study design

RCTs (including open label studies), quasi-RCTs, systematic reviews

### Status

Published papers (full text only)

### Population

People (no age restriction) with a confirmed diagnosis of stage 4 or 5 CKD, but not on dialysis.

### Intervention

Phosphate binders

- All licensed phosphate binders used in standard UK practice, including:
  - sevelamer hydrochloride
  - sevelamer carbonate
  - lanthanum carbonate
  - calcium-based phosphate binders (including: calcium carbonate, calcium acetate)
  - magnesium-based phosphate binders (including: magnesium carbonate) – not licensed as a monotherapy, but magnesium carbonate/calcium acetate combinations are aluminium-based phosphate binders (including: aluminium hydroxide)

### Comparator

Placebo or other phosphate binding treatment (or combinations)

### Outcomes

Overall and cardiovascular related mortality

- Serum phosphate
- Adverse effects
- Adherence to treatment
- Serum calcium
- Cardiovascular calcification scores

### Other criteria for inclusion/exclusion of studies

**Include**

- Papers comparing differing phosphate binders against each other or against placebo
- Relevant surrogate markers (serum calcium, cardiovascular calcification scores)
- People with a GFR that equates to CKD 4 or 5
- Cross over studies if initial allocation was random

**Exclude**

- Minimum follow up time is 3 months in terms of efficacy. This should be applied the quality appraisal through GRADE. Sensitivity analysis to be performed where appropriate.
People with CKD disease stages 1 to 3  
People on dialysis  
Open label extension studies

<table>
<thead>
<tr>
<th>Search strategies</th>
<th>RCTs, quasi-RCTs, systematic reviews</th>
</tr>
</thead>
</table>

| Review strategies | The NICE methodology checklist for RCTs will be used as a guide to appraise the quality of individual studies  
Data on all included studies will be extracted into evidence tables  
Where statistically possible, a meta-analytical approach will be used to give an overall summary effect  
Only the first part of the crossover will be analysed  
All key outcomes from evidence will be presented in GRADE profiles or modified profiles and further summarized in evidence statements  
Where a randomised crossover study is included, the data from the first treatment phase only will be extracted  
Sub-group analysis will be undertaken for children where appropriate  
Sub group analysis for diabetic nephropathy will be undertaken where appropriate  
Sub group analysis by CKD stage will be undertaken where appropriate. |

| Identified key studies | Systematic reviews  
Studies  

---

NICE clinical guideline 157 – hyperphosphataemia in chronic kidney disease (appendices C and D)
<table>
<thead>
<tr>
<th>Details</th>
<th>Additional comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Review question 3</strong></td>
<td>For people with stage 5 chronic kidney disease who are on dialysis, is the dietary management of phosphate effective in managing serum phosphate and its associated outcomes compared to placebo or other treatments? Which dietary methods are most effective?</td>
</tr>
</tbody>
</table>
| **Objectives** | To establish whether diet is effective in managing serum phosphate and its associated outcomes in patients with CKD 5 who are on dialysis.  
To determine whether there is variation between methods of restriction in terms of adherence to the diet.  
To determine if specific diets are more effective than others. |
| **Language** | English |
| **Study design** | RCTs, quasi-RCTs, systematic reviews |
| **Status** | Published papers (full text only) |
| **Population** | People (no age restriction) with a confirmed diagnosis of CKD 5 and who are on dialysis.  
Dietary management, including: phosphate restriction protein restriction (with or without amino acid and/or keto acid supplementation) |
| **Intervention** | Dietary management of phosphate |
| **Comparator** | Other diets or ‘normal’ diet |
| **Outcomes** | Serum Phosphate  
Need for additional phosphate management  
Adherence to treatment  
Adverse effects  
Serum iPTH |
| **Other criteria for inclusion/exclusion of studies** | **Include**  
People with a GFR that equates to CKD 5 and who are on dialysis  
Papers comparing differing diets against each other or against standard diets  
Relevant surrogate markers (serum iPTH)  
Protein restriction, phosphate restriction, keto acids, amino acids  
Cross over studies if initial allocation was random  
**Exclude**  
People with CKD stages 1 to 4  
People with a diagnosis of CKD 5 not on dialysis |
| **Search strategies** | RCTs, quasi-RCTs, systematic reviews |
| **Review strategies** | The NICE methodology checklist for RCTs will be used as a guide to appraise the quality of individual studies  
Data on all included studies will be extracted into evidence tables  
Where statistically possible, a meta-analytical approach will be used to give an overall summary effect  
All key outcomes from evidence will be presented in GRADE profiles or modified profiles and further summarized in evidence statements  
Where a randomised crossover study is included, the data from the first treatment phase only will be extracted |

Minimum follow up time is 3 months in terms of efficacy. This should be applied the quality appraisal through GRADE. Sensitivity analysis to be performed where appropriate.
<table>
<thead>
<tr>
<th>Identified key studies</th>
<th>Systematic reviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub group analysis for diabetic nephropathy will be undertaken where appropriate</td>
<td>Chaturvedi S, Jones C. Protein restriction for children with chronic kidney disease. Cochrane Database of Systematic Reviews 2007, Issue 4</td>
</tr>
<tr>
<td></td>
<td>European Study Group of Nutritional Treatment of Chronic Renal Failure in Childhood</td>
</tr>
<tr>
<td><strong>Details</strong></td>
<td><strong>Additional comments</strong></td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------</td>
</tr>
<tr>
<td><strong>Review question 4</strong></td>
<td>For people with stage 5 chronic kidney disease who are on dialysis, are phosphate binders effective compared to placebo or other treatments in managing serum phosphate and its associated outcomes? Which phosphate binder is the most effective?</td>
</tr>
<tr>
<td><strong>Objectives</strong></td>
<td>To determine whether phosphate binders are effective in controlling serum phosphate and preventing the associated outcomes in stage 5 CKD patients who are on dialysis. To determine which binder is most effective.</td>
</tr>
<tr>
<td><strong>Language</strong></td>
<td>English</td>
</tr>
<tr>
<td><strong>Study design</strong></td>
<td>RCTs (including open label studies), quasi RCTs, systematic reviews</td>
</tr>
<tr>
<td><strong>Status</strong></td>
<td>Published papers (full text only)</td>
</tr>
<tr>
<td><strong>Population</strong></td>
<td>People (no age restriction) with a confirmed diagnosis of stage 5 CKD and who are on dialysis.</td>
</tr>
<tr>
<td><strong>Intervention</strong></td>
<td>Phosphate binders used in standard UK practice, including: sevelamer hydrochloride sevelamer carbonate lanthanum carbonate calcium-based phosphate binders (including: calcium carbonate, calcium acetate) magnesium-based phosphate binders (including: magnesium carbonate) – not licensed as a monotherapy, but magnesium carbonate/calcium acetate combinations are. aluminium-based phosphate binders (including: aluminium hydroxide)</td>
</tr>
<tr>
<td><strong>Comparator</strong></td>
<td>Placebo or other phosphate binding treatment (or combinations)</td>
</tr>
<tr>
<td><strong>Outcomes</strong></td>
<td>Overall and cardiovascular related mortality Serum phosphate Adverse effects Adherence to treatment Serum calcium Cardiovascular calcification scores</td>
</tr>
<tr>
<td><strong>Other criteria for inclusion/exclusion of studies</strong></td>
<td>Include Papers comparing differing phosphate binders against each other or against placebo Relevant surrogate markers (serum calcium, serum iPTH / cardiovascular calcification scores) People with a GFR that equates to CKD 5 and who are on dialysis Cross over studies if initial allocation was random</td>
</tr>
</tbody>
</table>

Minimum follow up time is 3 months in terms of efficacy. This should be applied the quality appraisal through GRADE. Sensitivity analysis to be performed where appropriate.
<table>
<thead>
<tr>
<th>Exclude</th>
</tr>
</thead>
<tbody>
<tr>
<td>People with CKD stages 1 to 4</td>
</tr>
<tr>
<td>People with CKD stage 5 who are not on dialysis</td>
</tr>
<tr>
<td>Open label extension studies</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Search strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCTs, quasi-RCTs, systematic reviews</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Review strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>The NICE methodology checklist for RCTs will be used as a guide to appraise the quality of individual studies</td>
</tr>
<tr>
<td>Data on all included studies will be extracted into evidence tables</td>
</tr>
<tr>
<td>Where statistically possible, a meta-analytical approach will be used to give an overall summary effect</td>
</tr>
<tr>
<td>Only the first part of the crossover will be analysed</td>
</tr>
<tr>
<td>All key outcomes from evidence will be presented in GRADE profiles or modified profiles and further summarized in evidence statements</td>
</tr>
<tr>
<td>Where a randomised crossover study is included, the data from the first treatment phase only will be extracted</td>
</tr>
<tr>
<td>Sub-group analysis will be undertaken for children where appropriate</td>
</tr>
<tr>
<td>Sub group analysis for diabetic nephropathy will be undertaken where appropriate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Identified key studies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Calcium acetate vs calcium carbonate</strong></td>
</tr>
<tr>
<td><strong>Sevelamer vs placebo</strong></td>
</tr>
<tr>
<td><strong>Sevelamer hydrochloride vs sevelamer carbonate</strong></td>
</tr>
<tr>
<td><strong>Sevelamer vs calcium-based phosphate binders</strong></td>
</tr>
<tr>
<td>Chertow GM, Burke SK, Raggi P, Treat to Goal Working Group. Sevelamer attenuates the progression of coronary and aortic calcification in haemodialysis patients. Kidney</td>
</tr>
</tbody>
</table>


DCOR Trial

Sevelamer vs aluminium-based phosphate binders


Lanthanum vs placebo


Lanthanum vs calcium-based phosphate binders


Lanthanum vs sevelamer


Magnesium-based vs calcium-based phosphate binders


<table>
<thead>
<tr>
<th>Details</th>
<th>Additional comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Review question 5</strong></td>
<td>For people with stage 4 or 5 chronic kidney disease, both those on dialysis and those who are not, are patient information strategies effective in promoting adherence to phosphate-lowering dietary interventions, or in the management of serum phosphate and its associated outcomes? Which patient information strategies are most effective?</td>
</tr>
<tr>
<td><strong>Objectives</strong></td>
<td>To establish whether the patient information/education is effective in promoting adherence to phosphate-lowering dietary interventions in patients with stage 4 or 5 chronic kidney disease, or in contributing to the management of serum phosphate overall?</td>
</tr>
<tr>
<td></td>
<td>To determine whether there is variation between patient information/education methods in terms of adherence to phosphate-lowering diets.</td>
</tr>
<tr>
<td></td>
<td>To determine if specific methods are more effective than others.</td>
</tr>
<tr>
<td></td>
<td>To determine the information needs of patients using dietary interventions to manage their phosphate levels with regards to promoting adherence to the treatment.</td>
</tr>
<tr>
<td><strong>Language</strong></td>
<td>English</td>
</tr>
<tr>
<td><strong>Study design</strong></td>
<td>RCTs, quasi-RCTs, systematic reviews, non-randomised controlled trials, controlled before-and-after study</td>
</tr>
<tr>
<td><strong>Status</strong></td>
<td>Published papers (full text only)</td>
</tr>
<tr>
<td><strong>Population</strong></td>
<td>People (no age restriction) with a confirmed diagnosis of stage 4 or 5 CKD, with or without dialysis</td>
</tr>
<tr>
<td><strong>Intervention</strong></td>
<td>Patient information on the dietary management of hyperphosphataemia</td>
</tr>
<tr>
<td></td>
<td>Patient information strategies, including: information leaflets educational programs individual/group dietetic counseling</td>
</tr>
<tr>
<td><strong>Comparator</strong></td>
<td>Standard practice or other patient information/education strategies</td>
</tr>
<tr>
<td><strong>Outcomes</strong></td>
<td>Changes in adherence-promoting behaviours</td>
</tr>
<tr>
<td></td>
<td>Adherence to diet</td>
</tr>
<tr>
<td></td>
<td>Phosphate binder requirement</td>
</tr>
<tr>
<td></td>
<td>Changes in knowledge</td>
</tr>
<tr>
<td></td>
<td>Serum Phosphate</td>
</tr>
<tr>
<td></td>
<td>Changes in beliefs and attitudes towards health</td>
</tr>
<tr>
<td><strong>Other criteria for inclusion/exclusion of studies</strong></td>
<td>Include Papers comparing differing patient information strategies against each other or against standard practice. Relevant surrogate markers People with a GFR that equates to CKD 4 or 5 People on dialysis Leaflets, educational programs, counseling</td>
</tr>
<tr>
<td></td>
<td>Exclude People with CKD disease stages 1 to 3 Trials that examine only the information to be covered by education, rather than the strategy by which it should be delivered</td>
</tr>
<tr>
<td><strong>Search strategies</strong></td>
<td>RCTs, quasi-RCTs, systematic reviews, non-randomised controlled trials, cohort studies, controlled before-and-after study</td>
</tr>
</tbody>
</table>

NICE clinical guideline 157 – hyperphosphataemia in chronic kidney disease (appendices C and D)
### Review strategies

The NICE methodology checklists will be used as a guide to appraise the quality of individual studies. Data on all included studies will be extracted into evidence tables. Where statistically possible, a meta-analytical approach will be used to give an overall summary effect. All key outcomes from evidence will be presented in GRADE profiles or modified profiles and further summarized in evidence statements. Sub-group analysis will be undertaken for children where appropriate. Sub group analysis for those with diabetic nephropathy will be undertaken where appropriate. Sub group analysis by CKD stage will be undertaken where appropriate.

### Identified key studies

**Systematic reviews**


**Studies**


de Brito Ashurst I, Dobbie H. A randomized controlled trial of an educational intervention to improve phosphate levels in hemodialysis patients. *Journal of Renal Nutrition* Volume 13, Issue 4, October 2003, Pages 267-274

### Review question 6

For people with stage 4 or 5 chronic kidney disease, are prescribed supplements, alone or in conjunction with other interventions, effective, compared to placebo or other treatments, in managing serum phosphate and its associated outcomes? Which supplements are most effective?

### Objectives

To determine whether mineral and vitamin supplements are effective in controlling serum phosphate and preventing the associated outcomes in stage 4 and 5 CKD patients.

To determine which supplements are most effective.

### Language

English

### Study design

RCTs, quasi RCTs, systematic reviews

### Status

Published papers (full text only)

### Population

People (no age restriction) with a confirmed diagnosis of stage 4 or 5 CKD

### Intervention

Phosphate-lowering mineral and vitamin supplements

- Calcium supplements
- Niacin/nicotinamide

Calcium (elemental or in compound form) taken during or immediately before/after meals are considered phosphate binders, whereas calcium taken between meals are considered supplements

### Comparator

Placebo or other supplement (or combinations)

### Outcomes

- Overall and cardiovascular related mortality
- Serum phosphate
- Adverse effects
- Adherence to treatment
- Serum calcium
- Cardiovascular calcification scores

### Other criteria for inclusion/exclusion of studies

**Include**

- Papers comparing differing supplements against each other or against placebo, alone or in combination with other treatments
- Relevant surrogate markers
- People with a GFR that equates to CKD 4 or 5 who are not on dialysis
- Cross over studies if initial allocation was random

**Exclude**

- People with CKD disease stages 1 to 3
- People with CKD 5 who are on dialysis
- Vitamin D supplementation

Vitamin D preparations are excluded as their effectiveness is not disputed and they are already part of standard practice in the care of patients with stage 4 or 5 kidney disease.

GDG felt that supplementation for any reason other than for the management of hyperphosphataemia, such as the use of calcium supplements to manage hypocalcaemia, would be inappropriate for the review.

Minimum follow up time is 3 months in terms of efficacy. This should be applied the quality appraisal through
<table>
<thead>
<tr>
<th>Search strategies</th>
<th>GRADE. Sensitivity analysis to be performed where appropriate.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The NICE methodology checklist for RCTs will be used as a guide to appraise the quality of individual studies. Data on all included studies will be extracted into evidence tables. Where statistically possible, a meta-analytical approach will be used to give an overall summary effect. Only the first part of the crossover will be analysed. All key outcomes from evidence will be presented in GRADE profiles or modified profiles and further summarized in evidence statements. Where a randomised crossover study is included, the data from the first treatment phase only will be extracted. Sub-group analysis will be undertaken for children where appropriate. Sub group analysis for diabetic nephropathy will be undertaken where appropriate. Sub group analysis by CKD stage will be undertaken where appropriate.</td>
<td></td>
</tr>
<tr>
<td>Identified key studies</td>
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</table>

NICE clinical guideline 157 – hyperphosphataemia in chronic kidney disease (appendices C and D)
### Review question 7

For people with stage 5 chronic kidney disease who are on dialysis, are prescribed supplements, alone or in conjunction with other interventions, effective compared to placebo or other treatments in managing serum phosphate and its associated outcomes? Which is the most effective prescribed supplement?

### Objectives

To determine whether mineral and vitamin supplements are effective in controlling serum phosphate and preventing the associated outcomes in stage 5 CKD patients on dialysis

To determine which supplements are most effective.

### Language

English

### Study design

RCTs, Quasi RCTs, systematic reviews

### Status

Published papers (full text only)

### Population

People (no age restriction) with a confirmed diagnosis of stage 5 CKD and on dialysis

### Intervention

Phosphate-lowering mineral and vitamin supplements

- Calcium supplements
- Nicotinamide/niacinamide
- Calcium (elemental or in compound form) taken during or immediately before/after meals are considered phosphate binders, whereas calcium taken between meals are considered supplements

### Comparator

Placebo or other supplement (or combinations)

### Outcomes

- Overall and cardiovascular related mortality
- Serum phosphate
- Adverse effects
- Adherence to treatment
- Serum calcium
- Cardiovascular calcification scores

### Other criteria for inclusion/exclusion of studies

**Include**

- Papers comparing differing supplements against each other or against placebo, alone or in combination with other treatments
- Relevant surrogate markers
- People with a GFR that equates to CKD 5 who are on dialysis
- Cross over studies if initial allocation was random

**Exclude**

- People with CKD disease stages 1 to 5 who are not on dialysis
- Vitamin D supplementation
- Supplementation for any reason other than for the management of hyperphosphataemia
- Open label extension studies

Vitamin D preparations are excluded as their effectiveness is not disputed and they are already part of standard practice in the care of patients with stage 4 or 5 kidney disease.

GDG felt that supplementation for any reason other than for the management of hyperphosphataemia, such as the use of calcium supplements to manage hypocalcaemia, would be inappropriate for the review.

Minimum follow up time is 3 months in terms of efficacy. This should be applied the quality.
<table>
<thead>
<tr>
<th><strong>Search strategies</strong></th>
<th>RCTs, quasi RCTs, systematic reviews</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>Details</td>
<td>Additional comments</td>
</tr>
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<td>---------</td>
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</tr>
<tr>
<td><strong>Review question 8</strong></td>
<td>In the management of hyperphosphataemia in people with stage 4 or 5 chronic kidney disease, in what order should available treatments be considered? What are the clinical indications for commencing each?</td>
</tr>
<tr>
<td><strong>Objectives</strong></td>
<td>To determine at what point available treatment options for the management of hyperphosphataemia should be considered for people with stage 4 or 5 chronic kidney disease. To determine the appropriate clinical indications for starting each treatment option.</td>
</tr>
<tr>
<td><strong>Language</strong></td>
<td>English</td>
</tr>
<tr>
<td><strong>Study design</strong></td>
<td>RCTs, quasi-RCTs, systematic reviews, non-randomised controlled trials, cohort studies, cross sectional studies, case-control studies.</td>
</tr>
<tr>
<td><strong>Status</strong></td>
<td>Published papers (full text only)</td>
</tr>
<tr>
<td><strong>Population</strong></td>
<td>People (no age restriction) with a confirmed diagnosis of stage 4 or 5 CKD</td>
</tr>
<tr>
<td><strong>Intervention</strong></td>
<td>Treatment sequences for managing hyperphosphataemia</td>
</tr>
<tr>
<td><strong>Comparator</strong></td>
<td>Other treatment (or combinations) sequences</td>
</tr>
<tr>
<td><strong>Outcomes</strong></td>
<td>Overall and cardiovascular related mortality, Serum phosphate, Adverse effects, Adherence to treatment, Serum calcium, Cardiovascular calcification scores, Serum iPTH</td>
</tr>
<tr>
<td><strong>Other criteria for inclusion/exclusion of</strong></td>
<td>Include Papers comparing differing sequences of treatments for managing hyperphosphataemia against each other</td>
</tr>
<tr>
<td><strong>Details</strong></td>
<td>Treatment modalities for managing hyperphosphataemia, including: dietary management of phosphate (protein restriction, phosphate restriction, keto acids, amino acids) phosphate binders (sevelamer hydrochloride, sevelamer carbonate, lanthanum carbonate, calcium-based phosphate binders (including calcium carbonate and calcium acetate), magnesium/calcium carbonate combinations (including magnesium carbonate/calcium acetate combinations), aluminium-based phosphate binders (including aluminium hydroxide)) mineral/vitamin supplementation (calcium, nicotinamide, vitamin D) dialysis</td>
</tr>
<tr>
<td><strong>Additional comments</strong></td>
<td>Minimum follow up time is 3 months in terms of efficacy. This should be applied the quality</td>
</tr>
</tbody>
</table>
### Excluded studies

**Review question 1: Dietary management for people with stage 4 or 5 CKD who are not on dialysis**

<table>
<thead>
<tr>
<th>studies</th>
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</thead>
<tbody>
<tr>
<td>Relevant surrogate markers</td>
</tr>
<tr>
<td>People with a GFR that equates to CKD 4 or 5</td>
</tr>
<tr>
<td><strong>Exclude</strong></td>
</tr>
<tr>
<td>People with CKD stages 1 to 3</td>
</tr>
<tr>
<td>Trials that do not consider a sequence of treatments for managing hyperphosphataemia</td>
</tr>
<tr>
<td>appraisal through GRADE. Sensitivity analysis to be performed where appropriate.</td>
</tr>
</tbody>
</table>

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</tr>
</tbody>
</table>

**Excluded studies**

**105 identified from bibliographies**

**3026 retrieved from searches (Qs 1 & 3)**

**12 not received**

**260 full texts (Qs 1 & 3)**

**2871 excluded (title and abstract)**

**13 papers included**

**235 excluded (full text)**
Review question 3: Dietary management for people with stage 5 CKD who are on dialysis


Reason for exclusion: not published


Reason for exclusion: not an RCT or systematic review of RCTs

Reason for exclusion: not an RCT or systematic review of RCTs

Reason for exclusion: not an RCT or systematic review of RCTs

Reason for exclusion: not an RCT or systematic review of RCTs

Ando A; Orita Y; Nakata K; Fukuhara U; Mikami H; Fujii M; Nakajima Y; Ueda N; Abe H. (1981) The effect of essential amino acid supplementation therapy on prognosis of patients with chronic renal failure estimated on the basis of the Markov process. Medical Journal of Osaka University 32: 31-7 [ref ID: 14004]
Reason for exclusion: no relevant outcomes

Reason for exclusion: not an RCT or systematic review of RCTs

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs
Barrientos A; Arteaga J; Rodicio JL; Alvarez Ude F; Alcazar JM; Ruilope LM. (1982) Role of the control of phosphate in the progression of chronic renal failure. Mineral & Electrolyte Metabolism 7: 127-33 [ref ID: 14010]

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs

Barsotti G; Morelli E; Guiducci A; Ciardella F & Giannoni A. (1982) Reversal of hyperparathyroidism in severe uremics following very low protein and low phosphorus diet. Nephron 30: 310-3 [ref ID: 14012]

Reason for exclusion: not an RCT or systematic review of RCTs

Barsotti G; Morelli E; Giannoni A; Guiducci A; Lupetti S; Giovannetti S. (1983) Restricted phosphorus and nitrogen intake to slow the progression of chronic renal failure: a controlled trial. Kidney International – Supplement 16: S278-84 [ref ID: 206]

Reason for exclusion: not an RCT or systematic review of RCTs

Barsotti G; Giannoni A; Morelli E; Lazzeri M; Vlamis I; Baldi R; Giovannetti S. (1984) The decline of renal function slowed by a very low phosphorus intake in chronic renal failure following a low nitrogen diet. Clinical Nephrology 21: 54-9 [ref ID: 14013]
Barsotti G; Ciardella F; Morelli E; Cupisti A; Mantovanelli A; Giovannetti S. (1988) Nutritional treatment of renal failure in type 1 diabetic nephropathy. Clinical Nephrology 29: 280-7 [ref ID: 14014]

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs

Barsotti G; Cupisti A; Morelli E; Meola M; Cozza V; Barsotti M; Giovannetti S. [1998] Secondary hyperparathyroidism in severe chronic renal failure is corrected by very-low dietary phosphate intake and calcium carbonate supplementation. Nephron 79(2): 137-41 [ref ID: 209]

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs

Bellizzi V; Di Iorio BR; De Nicola L; Minutolo R; Zamboli P; Trucillo P; Catapano F; Cristofano C; Scalfi L; Conte G. (2007) Very low protein diet supplemented with ketoanalogs improves blood pressure control in chronic kidney disease. Kidney International 71(3): 245-51 [ref ID: 9143]

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: wrong population


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: wrong population

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs; abstract?


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: wrong population


Reason for exclusion: not an RCT or systematic review of RCTs

Reason for exclusion: wrong population


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not relevant


Reason for exclusion: not an RCT or systematic review of RCTs

Burns J; Cresswell E; Ell S; Flynn M; Jackson MA; Lee HA; Richards P; Rowlands A; Talbot S. (1978) Comparison of the effects of keto acid
analogues and essential amino acids on nitrogen homeostasis in uremic patients on moderately protein–restricted diets. American Journal of Kidney Disease 34: 500-7 [ref ID: 14023]

Reason for exclusion: not an RCT or systematic review of RCTs

Campbell KL; Ash S; Davies PS; Bauer JD. (2008) Randomized controlled trial of nutritional counseling on body composition and dietary intake in severe CKD. American Journal of Kidney Diseases 51(5): 748-58 [ref ID: 439]

Reason for exclusion: not relevant


Reason for exclusion: wrong population

Chauveau P; Barthe N; Rigalleau V; Ozenne S; Castaing F; Delclaux C; de Précigout V; Combe C; Aparicio M. (1999) Outcome of nutritional status and body composition of uremic patients on a very low protein diet. American Journal of Kidney Disease 34:500-7 [ref ID: 14024]

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs
Cianciaruso B; Pota A; Pisani A; Torraca S; Annecchini R; Lombardi P; Capuano A; Nazzaro P; Bellizzi V. (2008) Metabolic effects of two low protein diets in chronic kidney disease stage 4-5—a randomized controlled trial. Nephrology Dialysis Transplantation 23(2): 638-44 [ref ID: 4224]

Reason for exclusion: duplicate of included paper

Ciardella F; Morelli E; Niosi F; Caprioli R; Baldi R; Cupisti A; Petronio G; Carbone C; Barsotti G. (1986) Effects of a low phosphorus, low nitrogen diet supplemented with essential amino acids and ketoanallogues on serum triglycerides of chronic uremic patients. Nephron 42:196-9 [ref ID: 14025]

Reason for exclusion: not an RCT or systematic review of RCTs

Ciardella F; Cupisti A; Catapano G; Guidi A; Pasquinucci A; Morelli E; Barsotti G. (1989) Effects of a low phosphorus, low nitrogen diet supplemented with essential amino acids and ketoanallogues on serum beta-endorphin in chronic renal failure. Nephron 53(2): 129-32 [ref ID: 14095]

Reason for exclusion: not an RCT or systematic review of RCTs

Coggins CH; Dwyer JT; Greene T; Petot G; Snetselaar LG. (1994) Serum lipid changes associated with modified protein diets: results from the feasibility phase of the Modification of Diet in Renal Disease Study. American Journal of Kidney Diseases 23(4): 514-23 [ref ID: 9369]

Reason for exclusion: wrong population

Reason for exclusion: wrong population

Combe C; Deforges-Lasseur C; Caix J; Pommereau A; Marot D; Aparicio M. (1993) Compliance and effects of nutritional treatment on progression and metabolic disorders of chronic renal failure. Nephrology Dialysis Transplantation 8(5): 412-8 [ref ID: 7218]

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs

Combe C; Morel D; de Précigout V; Blanchetier V; Bouchet JL; Potaux L; Fournier A; Aparicio M. (1995) Long-term control of hyperparathyroidism in advanced renal failure by low-phosphorus low-protein diet supplemented with calcium (without changes in plasma calcitriol. Nephron 70: 287-95 [ref ID: 14028]

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: wrong population


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: wrong population


Reason for exclusion: not an RCT or systematic review of RCTs

Di Landro D; Perin N; Bertoli M; Gasparotto ML; Ruffatti A; Naso A; Vertolli U; Urso M; Romagnoli GF. (1986) Clinical effects of a low protein diet supplemented with essential amino acids and keto analogues in uremic patients. Contributions to Nephrology 53: 137-43 [ref ID: 14029]

Reason for exclusion: not an RCT or systematic review of RCTs

Di Landro D; Dattilo GA; Romagnoli GF. (1990) Comparative outcome of patients on a conventional low protein diet versus a supplemented diet in chronic renal failure. Contributions to Nephrology 81: 201-7 [ref ID: 14030]

Reason for exclusion: not an RCT or systematic review of RCTs
Dimitrakov D; Natov S; Bakalov V. (1989) Treatment of chronic renal failure with a low protein diet enriched with 'Salviamin LX'. Folia Medica (Plovdiv) 31(2): 10-3 [ref ID: 707]

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: wrong population


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: duplicate of included population

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs

Forget D; Caranhac G; Quillot MJ; Besnier MO. (1990) Compliance with very low protein diet and ketoanalogues in chronic renal failure. The French Multicentric Trial IRCCA. Contributions to Nephrology 81: 79-86 [ref ID: 856]

Reason for exclusion: wrong population


Reason for exclusion: wrong population

Fouque D; Wang P; Laville M; Boissel JP. (2000) Low protein diets delay end-stage renal disease in non diabetic adults with chronic renal failure. Cochrane Database of Systematic Reviews, issue 2 [ref ID: 861]

Reason for exclusion: wrong population

Reason for exclusion: wrong population

Fouque D; Wang P; Laville M; Boissel JP. (2001) Low protein diets for chronic renal failure in non diabetic adults. Cochrane Database of Systematic Reviews, issue 2 [ref ID: 864]

Reason for exclusion: wrong population

Fouque D; McKenzie J; de Mutsert R; Azar R; Teta D; Plauth M; Cano N; Renilon Multicentre Trial Study Group. (2008) Use of a renal-specific oral supplement by haemodialysis patients with low protein intake does not increase the need for phosphate binders and may prevent a decline in nutritional status and quality of life. Nephrology Dialysis Transplantation 23(9): 2902-10 [ref ID: 868]

Reason for exclusion: not relevant


Reason for exclusion: not an RCT or systematic review of RCTs

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Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs

Reason for exclusion: wrong population


Reason for exclusion: wrong population

Gillis BP; Caggiula AW; Chiavacci AT; Coyne T; Doroshenko L; Milas NC; Nowalk MP; Scherch LK. (1995) Nutrition intervention program of the Modification of Diet in Renal Disease Study: a self-management approach. Journal of the American Dietetic Association 95(11): 1288-94 [ref ID: 954]

Reason for exclusion: not relevant

Gin H; Aparicio M; Potaux L; Merville P; Combe C; de Precigout V; Bouchet JL; Aubertin J. (1991) Low-protein, low-phosphorus diet and tissue insulin sensitivity in insulin-dependent diabetic patients with chronic renal failure. Nephron 57(4): 411-5 [ref ID: 14040]

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs
Giovannetti S; Maggiore Q. (1964) A low-nitrogen diet with proteins of high biological value for severe chronic uraemia. Lancet 1(7341): 1000-3 [ref ID: 14101]

Reason for exclusion: not an RCT or systematic review of RCTs


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Reason for exclusion: wrong population

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Reason for exclusion: not an RCT or systematic review of RCTs


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Reason for exclusion: wrong population

Reason for exclusion: wrong population


Reason for exclusion: wrong population

Ideura T; Shimazui M; Morita H; Yoshimura A. (2007) Protein intake of more than 0.5 g/kg BW/day is not effective in suppressing the progression of chronic renal failure. Contributions to Nephrology 155: 40-9 [ref ID: 1160]

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: wrong population

Jiang N; Qian J; Lin A; Fang W; Cao L; Wang Q; Ni Z; Lindholm B; Axelsson J; Yao Q. (2010) Improved plasma amino acids pattern following 12 months of supplemented low-protein diet in peritoneal dialysis patients. Renal Failure 32(6): 709-15 [ref ID: 7451]

Reason for exclusion: not an RCT or systematic review of RCTs; no relevant outcomes
Jiang N; Qian J; Lin A; Fang W; Cao L; Wang Q; Ni Z; Lindholm B; Axelsson J; Yao Q. (2010). Improved plasma amino acids pattern following 12 months of supplemented low-protein diet in peritoneal dialysis patients. Renal Failure 32(6): 709-15 [ref ID: 9921]

Reason for exclusion: not an RCT or systematic review of RCTs; no relevant outcomes

Jiang N; Qian J; Lin A; Fang W; Zhang W; Cao L; Wang Q; Ni Z. (2011) Low-protein diet supplemented with keto acids is associated with suppression of small-solute peritoneal transport rate in peritoneal dialysis patients. International Journal of Nephrology 542704 Epub 20 [ref ID: 9922]

Reason for exclusion: no relevant outcomes

Jureidini KF; Hogg RJ; van Renen MJ; Southwood TR; Henning PH; Cobiac L; Daniels L; Harris S. (1990) Evaluation of long-term aggressive dietary management of chronic renal failure in children. Pediatric Nephrology 4: 1-10 [ref ID: 14048]

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs

Reason for exclusion: wrong population


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs

Kist-van Holthe tot Echten JE; Nauta J; Hop WC; de Jong MC; Reitsma-Bierens WC; Ploos van Amstel SL; van Acker KJ; Noordzij CM; Wolff ED. (1993) Protein restriction in chronic renal failure. Archives of Disease in Childhood 68(3): 371-5 [ref ID: 14049]

Reason for exclusion: wrong population


Reason for exclusion: not in English

Reason for exclusion: outcomes not relevant; duplicate of included population


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: duplicate of included population

Klahr S. (1996) Is there still a role for a diet very low in protein, with or without supplements, in the management of patients with end-stage renal failure? Current Opinion in Nephrology and Hypertension 5(4): 384-7 [ref ID: 10019]

Reason for exclusion: not an RCT or systematic review of RCTs

Kopple JD; Sorensen MK; Coburn JW; Gordon S; Rubini ME. (1968) Controlled comparison of 20-g and 40-g protein diets in the treatment of chronic renal failure. American Journal of Clinical Nutrition 21: 553-64 [ref ID: 14091]
Reason for exclusion: population included CKD 5 and 5D (cannot be analysed separately)


Reason for exclusion: no relevant outcomes; not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs

Kupin WL; Cortes P; Dumler F; Feldkamp CS; Kilates MC; Levin NW. (1987) Effect on renal function of change from high to moderate protein intake in type 1 patients. Diabetes 36: 73-9 [ref ID: 14050]

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: outcomes and design not relevant


Reason for exclusion: duplicate of included population


Reason for exclusion: wrong population
Levine SE; d'Elia JA; Bistrian B; Smith-Ossman S; Gleason R; Mitch WE; Miller DG. (1989) Protein restricted diets in diabetic nephropathy. Nephron 52: 55-61 [ref ID: 14053]

Reason for exclusion: not an RCT or systematic review of RCTs

Li T; Wu HM; Wang F; Huang CQ; Yang M; Dong BR; Liu GJ. (2011) Education programmes for people with diabetic kidney disease. Cochrane Database of Systematic Reviews, issue 6 [ref ID: 1516]

Reason for exclusion: wrong population


Reason for exclusion: not an RCT or systematic review of RCTs

Lindenau K; Kokot F; Fröhling PT. (1986) Suppression of parathyroid hormone by therapy with a mixture of ketoanalogues/amino acids in hemodialysis patients. Nephron 43: 84-6 [ref ID: 14055]

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs

Reason for exclusion: wrong population


Reason for exclusion: wrong population


Reason for exclusion: no relevant outcomes


Reason for exclusion: no relevant outcomes

Locatelli F; Alberti D; Graziani G; Buccianti G; Redaelli B; Giangrande A; Marcelli D; Francucci BM. (1992) Factors affecting chronic renal failure progression: results from a multicentre trial. The Northern Italian Cooperative Study Group. Mineral & Electrolyte Metabolism 18(2-5): 295-302 [ref ID: 1569]

Reason for exclusion: not relevant

Reason for exclusion: wrong population

Locatelli F; Marcelli D; Marai P. (1994) Low protein diet may postpone the start of dialysis without affecting the early progression of chronic renal insufficiency. Journal of Nephrology 7(1): 36-42 [ref ID: 1571]

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not in English


Reason for exclusion: not in English


Reason for exclusion: follow-up too short

Maiorca R; Brunori G; Viola BF; Zubani R; Cancarini G; Parrinello G; De Carli A. (2000) Diet or dialysis in the elderly? The DODE study: a prospective
randomized multicenter trial. Journal of Nephrology 13(4): 267-70 [ref ID: 1633]

Reason for exclusion: no results given

Mariani G; Barsotti G; Ciardella F; Molea N; Morelli E; Mazzuca N; Niosi F; Bonaguidi F; Fusani L; Panicucci F, et al. (1984) Albumin metabolism and nutritional status of uremic patients on a long-term very-low-protein diet supplemented with essential amino acids and keto analogues. Journal of nuclear medicine and allied sciences 28(4): 237-44 [ref ID: 14096]

Reason for exclusion: not an RCT or systematic review of RCTs; wrong population


Reason for exclusion: not an RCT or systematic review of RCTs; wrong population

Maschio G; Oldrizzi L; Tessitore N; D'Angelo A; Valvo L; Lupo A; Loschiavo C; Fabris A; Gammaro L; Rugiu C; Panzetta G. (1982) Effects of dietary and phosphorus restrictions on the progression of chronic renal failure. Kidney International 22: 371-6 [ref ID: 14059]

Reason for exclusion: not an RCT or systematic review of RCTs

Maschio G; Oldrizzi L; Tessitore N; D'Angelo A; Valvo E; Lupo A; Loschiavo C; Fabris A; Gammaro L; Rugiu C, et al. (1983) Early dietary protein and
phosphorus restriction is effective in delaying progression of chronic renal failure. Kidney International 24(suppl 16): 273-7 [ref ID: 14060]

Reason for exclusion: not an RCT or systematic review of RCTs

Maschio G; Oldrizzi L; Rugiu C; Valvo E; Lupo A; Loschiavo C; Tessitore N; Fabris A; Gammaro L; Panzetta G. (1987) Factors affecting progression of renal failure in patients on long term dietary protein restriction. Kidney International 32(supple 22): 49-52 [ref ID: 14061]

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: wrong population


Reason for exclusion: not an RCT or systematic review of RCTs

McKenzie J; de Mutsert R; Fouque D; Cano N; Plauth M; Schlawin H; Burnier M; Teta D; Abokasem A; Aladib M; Azar R; Bony C; Broyet C; Chauveau P; Chazot C; Delcroix C; Depuis E; Guy JP; Hadj El Mrabet A; Heyani A; Nemmar F; Vendrely B. (2008) Use of a renal-specific oral supplement by haemodialysis patients with low protein intake does not increase the need for phosphate binders and may prevent a decline in nutritional status and quality of life. Nephrology Dialysis Transplantation 23(9): 2902-10 [ref ID: 7659]

NICE clinical guideline 157 – hyperphosphataemia in chronic kidney disease (appendices C and D)
Reason for exclusion: not relevant


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: wrong population

Meloni C; Tatangelo P; Cipriani S; Rossi V; Suraci C; Tozzo C; Rossini B; Cecilia A; Di Franco D; Straccialano E; Casciani CU. (2004) Adequate protein dietary restriction in diabetic and nondiabetic patients with chronic renal failure. Journal of Renal Nutrition 14(4): 208-13 [ref ID: 1761]

Reason for exclusion: wrong population

Reason for exclusion: no relevant outcomes


Reason for exclusion: not an RCT or systematic review of RCTs; wrong population


Reason for exclusion: abstract only


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs

Reason for exclusion: wrong population


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: no relevant outcomes

Reason for exclusion: wrong population


Reason for exclusion: outcomes not relevant; duplicate of included population


Reason for exclusion: not relevant

Moe SM; Zidehsarai MP; Chambers MA; Jackman LA; Radcliffe JS; Trevino LL; Donahue SE; Asplin JR. (2011) Vegetarian compared with meat dietary protein source and phosphorus homeostasis in chronic kidney disease. Clinical Journal of the American Society of Nephrology 6(2): 257-64 [ref ID: 1830]

Reason for exclusion: wrong population

Reason for exclusion: not an RCT or systematic review of RCTs

Montes-Delgado R; Guerrero Riscos MA; García-Luna PP; Martín Herrera C; Pereira Cunill JL; Garrido Vázquez M; López Muñoz I; Suárez García MJ; Martín-Espejo JL; Soler Junco ML; Barbosa Martín F. (1998) Therapy with a low-protein diet and caloric supplements in patients with chronic renal failure in predialysis. Comparative study. Revista Clínica Española 198(9): 580-6 [ref ID: 1843] [ref ID: 10369]

Reason for exclusion: not in English

Monzani G; Bergesio F; Ciuti R; Cicianni AM; Martinelli F; Rosati A. (1997) Lp(a) levels: effects of progressive chronic renal failure and dietary manipulation. Journal of Nephrology 10(1): 41-5 [ref ID: 10370]

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not relevant

Noori N; Kalantar-Zadeh K; Kovesdy CP; Bross R; Benner D; Kopple JD. (2010) Association of dietary phosphorus intake and phosphorus to protein...

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs

Oldrizzi L; Rugiu C; Valvo E; Lupo A; Loschiavo C; Gammaro L; Tessitore N; Fabris A; Panzetta G; Maschio G. (1985) Progression of renal failure in patients with renal disease of diverse etiology on protein-restricted diet. Kidney International 27: 553-7 [ref ID: 14071]

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: wrong population


Reason for exclusion: wrong population


Reason for exclusion: wrong population

Reason for exclusion: wrong population

Reason for exclusion: wrong population

Robertson LM; Waugh N; Robertson A. (2007) Protein restriction for diabetic renal disease. Cochrane Database of Systematic Reviews, issue 4 [ref ID: 7833]
Reason for exclusion: not an RCT or systematic review of RCTs

Reason for exclusion: no relevant outcomes

Reason for exclusion: no relevant outcomes
Rosman JB; Gretz N; van der Hem GK; Strauch M; Donker AJ. (1986) Protein restriction in chronic renal failure: correlation between creatinine clearance and the reciprocal serum creatinine. Contributions to Nephrology 53: 74-81 [ref ID: 2222]

Reason for exclusion: not relevant

Rosman JB; Donker AJ; Meijer S; Sluiter WJ; Piers-Becht TP; van der Hem GK. (1986) Two years' experience with protein restriction in chronic renal failure. Contributions to Nephrology 53: 109-20 [ref ID: 2223]

Reason for exclusion: no relevant outcomes


Reason for exclusion: wrong population; no relevant outcomes

Rudberg S; Dahlquist G; Aperia A; Persson B. (1988) Reduction of protein intake decreases glomerular filtration rate in young type 1 diabetic patients mainly in hyperfiltering patients. Diabetologia 31: 878-83 [ref ID: 14073]

Reason for exclusion: wrong population


Reason for exclusion: not an RCT or systematic review of RCTs
Sanchez C; Aranda P; Planells E; Galindo P; de la Cruz P; Larrubia M; Llopis J. (2010) Influence of low-protein dietetic foods consumption on quality of life and levels of B vitamins and homocysteine in patients with chronic renal failure. Nutricon Hospitalaria 25(2): 238-44 [ref ID: 2299]

Reason for exclusion: wrong population


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs

Schmicker R; Froehling PT; Goetz KH; Kaschube I; Rakette I; Vetter K. (1986) Influence of low protein diet supplemented with amino acids and keto acids on
the progression of chronic renal failure. Contributions to Nephrology 53: 121-7 [ref ID: 2338]

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs

Shaw A; Bazzard F; Booth E; Nilwarangkur S; Berlyne G. (1965) The treatment of chronic renal failure by a modified Giovannetti diet. QJM 34: 237-53 [ref ID: 14103]

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs

Soroka N; Silverberg DS; Greemland M; Birk Y; Blum M; Peer G; Iaina A. (1998) Comparison of a vegetable-based (soya) and an animal-based low-protein diet in predialysis chronic renal failure patients. Nephron 79(2): 173-80 [ref ID: 2447]

Reason for exclusion: wrong population

Sutton D; Higgins B; Stevens JM. (2007) Continuous ambulatory peritoneal dialysis patients are unable to increase dietary intake to recommended levels. Journal of Renal Nutrition 17(5): 329-35 [ref ID: 2503]

Reason for exclusion: not relevant
Takeda E; Yamamoto H; Nishida Y; Sato T; Sawada N. (2007) Phosphate restriction in diet therapy. Contributions to Nephrology 155: 113-24 [ref ID: 5175]

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not relevant

Reason for exclusion: not relevant


Reason for exclusion: not in English

Teplan V; Schuck O; Votruba M; Poledne R; Kazdova L; Skibova J. (2001) Metabolic effects of keto acid - Amino acid supplementation in patients with chronic renal insufficiency receiving a low-protein diet and recombinant human erythropoietin - a randomized controlled trial. Wiener Klinische Wochenschrift 113(17-18): 661-9 [ref ID: 10931]

Reason for exclusion: not relevant


Reason for exclusion: wrong population

Reason for exclusion: not an RCT or systematic review of RCTs

Teplan V; Schuck O; Racek J; Mareckova O; Stollova M; Hanza V. (2008) Reduction of plasma asymmetric dimethylarginine in obese patients with chronic kidney disease after three years of a low-protein diet supplemented with keto-amino acids: a randomized controlled trial. Wiener Klinische Wochenschrift 120(15-16): 478-85 [ref ID: 10935]

Reason for exclusion: wrong population

Teschan PE; Beck GJ; Dwyer JT; Greene T; Klahr S; Levy AS; Mitch WE; Snetselaar LG; Steinman TI; Walser M. (1998) Effect of a keto acid amino acid-supplemented very low protein diet on the progression of advanced renal disease: a reanalysis of the MDRD feasability study. Clinical Nephrology 50(5): 273-83 [ref ID: 14077]

Reason for exclusion: no relevant outcomes


Reason for exclusion: not an RCT or systematic review of RCTs

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: abstract only

Walker JD; Bending JJ; Dodds RA; Mattock MB; Murrells TJ; Keen H; Viberti GC. (1989) Restriction of dietary protein and progression of renal failure in diabetic nephropathy. Lancet 2: 1411-5 [ref ID: 14079]

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: crossover does not analyse by group, but pools by intervention (unit-of-analysis error precludes inclusion)


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: abstract only

Williams PS; Stevens ME; Fass G; Irons L; Bone JM. (1991) Failure of dietary protein and phosphate restriction to retard the rate of progression of chronic

Reason for exclusion: wrong population

Wingen AM; Braun A; Busch C; Mehls O. (1994) Influence of a low-protein diet on the progression of kidney failure in children (results after 2 years). Monatsschrift fur Kinderheilkunde 142: 157 [ref ID: 2783]

Reason for exclusion: not in English


Reason for exclusion: wrong population


Reason for exclusion: wrong population

Reason for exclusion: wrong population


Reason for exclusion: wrong population


Reason for exclusion: not relevant


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: wrong population

Zakar G; Hungarian Ketosteril Cohort Study. (2001) The effect of a keto acid supplement on the course of chronic renal failure and nutritional parameters in predialysis patients and patients on regular hemodialysis therapy: the
Hungarian Ketosteril Cohort Study. Wiener klinische wochenschrift 113: 688-94 [ref ID: 14090]

Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: not an RCT or systematic review of RCTs


Reason for exclusion: wrong population

**Review question 5: Patient information strategies**

Reason for exclusion: not a controlled trial or systematic review of controlled trials


Reason for exclusion: not relevant


Reason for exclusion: not relevant


Reason for exclusion: full paper not available

Reason for exclusion: not relevant

Binik YM; Devins GM; Barre PE; Guttmann RD; Hollomby DJ; Mandin H; Paul LC; Hons RB; Burgess ED. (1993) Live and learn: patient education delays the need to initiate renal replacement therapy in end-stage renal disease. Journal of Nervous and Mental Disease 181(6): 371-6 [ref ID: 15002]

Reason for exclusion: not relevant


Reason for exclusion: not a controlled trial or systematic review of controlled trials

Blaszak RT; Mitsnefes MM; Ilyas M; Salman SD; Belcher SM; Brady DR. (2005) Hyperphosphatemia in children receiving peritoneal dialysis - an educational program. Pediatric Nephrology 20(7): 967-71 [ref ID: 7110]

Reason for exclusion: not a controlled trial or systematic review of controlled trials


Reason for exclusion: not a controlled trial or systematic review of controlled trials

Reason for exclusion: not a controlled trial or systematic review of controlled trials


Reason for exclusion: not relevant


Reason for exclusion: includes data from unpublished trials

Campbell KL; Ash S; Davies PSW; Bauer JD. (2008) Randomized Controlled Trial of Nutritional Counseling on Body Composition and Dietary Intake in Severe CKD. American Journal of Kidney Diseases 51(5): 748-58 [ref ID: 7154]

Reason for exclusion: duplicate of included study

Reason for exclusion: not a controlled trial or systematic review of controlled trials


Reason for exclusion: not a controlled trial or systematic review of controlled trials


Reason for exclusion: intervention not relevant

Cianciaruso B; Capuano A; d'Amaro E; Ferrara N; Nastasi A; Conte G; Bellizzi V; Andreucci VE. (1989) Dietary compliance to a low protein and phosphate diet in patients with chronic renal failure. Kidney International 36(suppl 27): S173-6 [ref ID: 7210]

Reason for exclusion: not relevant

Combe C; Deforges-Lasseur C; Caix J; Pommereau A; Marot D; Aparicio M. (1993) Compliance and effects of nutritional treatment on progression and metabolic disorders of chronic renal failure. Nephrology Dialysis Transplantation 8(5): 412-8 [ref ID: 7218]

Reason for exclusion: not relevant

Reason for exclusion: not a controlled trial or systematic review of controlled trials

Coyne T; Olson M; Bradham K; Garcon M; Gregory P; Scherch L. (1995) Dietary satisfaction correlated with adherence in the Modification of Diet in Renal Disease Study. Journal of the American Dietetic Association 95(11): 1301-6 [ref ID: 7228]

Reason for exclusion: not relevant


Reason for exclusion: wrong population


Reason for exclusion: not a controlled trial or systematic review of controlled trials

Reason for exclusion: not relevant


Reason for exclusion: wrong population


Reason for exclusion: full paper not available


Reason for exclusion: not a controlled trial or systematic review of controlled trials


Reason for exclusion: not a controlled trial or systematic review of controlled trials

Reason for exclusion: not relevant


Reason for exclusion: not relevant


[ref ID: 7318]

Reason for exclusion: full paper not available


Reason for exclusion: not a controlled trial or systematic review of controlled trials

Reason for exclusion: full paper not available

Forget D; Caranac G; Quillot MJ; Besnier MO. (1990) Compliance with very low protein diet and ketoanalogues in chronic renal failure. The French Multicentric Trial IRCCA. Contributions to Nephrology 81: 79-86 [ref ID: 856]
Reason for exclusion: wrong population

Reason for exclusion: not relevant

Reason for exclusion: not a controlled trial or systematic review of controlled trials

Reason for exclusion: wrong population
Gillis BP; Caggiula AW; Chiavacci AT; Coyne T; Doroshenko L; Milas NC; Nowalk MP; Scherch LK. (1995) Nutrition intervention program of the Modification of Diet in Renal Disease Study: a self-management approach. Journal of the American Dietetic Association 95(11): 1288-94 [ref ID: 7362]

Reason for exclusion: not relevant


Reason for exclusion: not relevant


Reason for exclusion: not a controlled trial or systematic review of controlled trials

Hitchcock PB; Brantley PJ; Jones GN; McKnight GT. (1992) Stress and social support as predictors of dietary compliance in hemodialysis patients. Behavioral Medicine 18(1): 13-20 [ref ID: 7411]

Reason for exclusion: not relevant

Reason for exclusion: not relevant; not a controlled trial or systematic review of controlled trials

Reason for exclusion: not relevant

Reason for exclusion: not a controlled trial or systematic review of controlled trials

Reason for exclusion: not a controlled trial or systematic review of controlled trials

Reason for exclusion: not relevant

Reason for exclusion: not a controlled trial or systematic review of controlled trials


Reason for exclusion: not a controlled trial or systematic review of controlled trials


Reason for exclusion: not a controlled trial or systematic review of controlled trials


Reason for exclusion: not a controlled trial or systematic review of controlled trials
Khalil AA; Frazier SK; Lennie TA; Sawaya BP. (2011) Depressive symptoms and dietary adherence in patients with end-stage renal disease. Journal of Renal Care 37(1): 30-9 [ref ID: 7501]

Reason for exclusion: not relevant


Reason for exclusion: not a controlled trial or systematic review of controlled trials


Reason for exclusion: not a controlled trial or systematic review of controlled trials


Reason for exclusion: not relevant


Reason for exclusion: not relevant

Reason for exclusion: not a controlled trial or systematic review of controlled trials

Levin A; Lewis M; Mortiboy P; Faber S; Hare I; Porter EC; Mendelssohn DC. (1997) Multidisciplinary predialysis programs: quantification and limitations of their impact on patient outcomes in two Canadian settings. American Journal of Kidney Diseases 29(4): 533-40 [ref ID: 15004]

Reason for exclusion: not relevant

Li T; Wu HM; Wang F; Huang CQ; Yang M; Dong BR; Liu GJ. (2011) Education programmes for people with diabetic kidney disease. Cochrane Database of Systematic Reviews, issue 6 [ref ID: 7585]

Reason for exclusion: wrong population


Reason for exclusion: not a controlled trial or systematic review of controlled trials

Reason for exclusion: not a controlled trial or systematic review of controlled trials


Reason for exclusion: not relevant


Reason for exclusion: not relevant

Milas NC; Nowalk MP; Akpele L; Castaldo L; Coyne T; Doroshenko L; Kigawa L; Korzec-Ramirez D; Scherch LK; Snetselaar L. (1995) Factors associated with adherence to the dietary protein intervention in the Modification of Diet in Renal Disease Study. Journal of the American Dietetic Association 95(11): 1295-300 [ref ID: 7679]

Reason for exclusion: not a controlled trial or systematic review of controlled trials


Reason for exclusion: not relevant

Reason for exclusion: not a controlled trial or systematic review of controlled trials


Reason for exclusion: not a controlled trial or systematic review of controlled trials


Reason for exclusion: not relevant


Reason for exclusion: not a controlled trial or systematic review of controlled trials

Reason for exclusion: not relevant


Reason for exclusion: not relevant


Reason for exclusion: not a controlled trial or systematic review of controlled trials


Reason for exclusion: not a controlled trial or systematic review of controlled trials; letter only


Reason for exclusion: not a controlled trial or systematic review of controlled trials; not relevant
Prowant BF; Satalowich RJ; Murray-Bell A; Ryan LP; Schmidt LM; Kennedy JM; Baker BL. (1989) Effectiveness of a phosphorous educational program for dialysis patients. Anna Journal 16(5): 353-7 [ref ID: 7794]

Reason for exclusion: not a controlled trial or systematic review of controlled trials

Rambod M; Peyravi H; Shokrpour N; Sareban MT. (2010) Dietary and fluid adherence in Iranian hemodialysis patients. The Health Care Manager 29(4): 359-64 [ref ID: 7813]

Reason for exclusion: not relevant


Reason for exclusion: not a controlled trial or systematic review of controlled trials


Reason for exclusion: not a controlled trial or systematic review of controlled trials
Robertson LM; Waugh N; Robertson A. (2007) Protein restriction for diabetic renal disease. Cochrane Database of Systematic Reviews, issue 4 [ref ID: 7833]

Reason for exclusion: not relevant


Reason for exclusion: not relevant


Reason for exclusion: not a controlled trial or systematic review of controlled trials, only a qualitative adjunct

Sanchez C; Aranda P; Planells E; Galindo P; de la Cruz P; Larrubia M; Llopis J. (2010) Influence of low-protein dietetic foods consumption on quality of life and levels of B vitamins and homocysteine in patients with chronic renal failure. Nutricion Hospitalaria 25(2): 238-44 [ref ID: 7867]

Reason for exclusion: not relevant; wrong population

Reason for exclusion: not relevant

Reason for exclusion: not a controlled trial or systematic review of controlled trials

Reason for exclusion: not relevant

Reason for exclusion: not relevant

Reason for exclusion: not a controlled trial or systematic review of controlled trials

Reason for exclusion: not a controlled trial or systematic review of controlled trials

Sun CY; Chang KC; Chen SH; Chang CT; Wu MS. (2008) Patient education: an efficient adjuvant therapy for hyperphosphatemia in hemodialysis patients. Renal Failure 30(1): 57-62 [ref ID: 7959]

Reason for exclusion: not a controlled trial or systematic review of controlled trials


Reason for exclusion: not a controlled trial or systematic review of controlled trials

Sutton D; Higgins B; Stevens JM. (2007). Continuous ambulatory peritoneal dialysis patients are unable to increase dietary intake to recommended levels. Journal of Renal Nutrition 17(5): 329-35 [ref ID: 7967]

Reason for exclusion: not relevant

Reason for exclusion: not a controlled trial or systematic review of controlled trials


Reason for exclusion: not relevant


Reason for exclusion: not relevant


Reason for exclusion: not relevant


Reason for exclusion: not relevant

Reason for exclusion: not a controlled trial or systematic review of controlled trials

Welch JL; Siek KA; Connelly KH; Astroth KS; McManus MS; Scott L; Heo S; Kraus MA. (2010) Merging health literacy with computer technology: Self-managing diet and fluid intake among adult hemodialysis patients. Patient Education and Counseling 79(2): 192-8 [ref ID: 8064]

Reason for exclusion: not relevant

Yamaji K; Kuru A; Okamoto M; Sekiguchi Y; Horikoshi S; Tomino Y. (2007) Effect of educational hospitalization on chronic kidney disease (CKD) patients. Clinical Nephrology 68(6): 401-4 [ref ID: 8083]

Reason for exclusion: wrong population


Reason for exclusion: not relevant

**Review question 2: Use of phosphate binders in people with stage 4 or 5 CKD who are not on dialysis**

Reason for exclusion: Not an RCT


Reason for exclusion: Not a systematic review of RCTs

Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not the population of interest


Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Data not extractable


Reason for exclusion: Intervention not relevant

Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not a systematic review of RCTs

Arest' N; Amor J; Cambil T; Salgueira M; Sýnchez-Palencia R; Pýez C et al. [Early treatment of secondary hyperparathyroidism in moderate renal insufficiency: low-phosphorus diet versus calcium carbonate]. Nefrolog-a : publicaciñ formal de la Sociedad Española Nefrologia 2003;23 Suppl 2:64-68

Reason for exclusion: Not received

Asmus HG; Braun J; Krause R; Brunkhorst R; Holzer H; Schulz W; Neumayer HH; Raggi P; Bommer J. (2005) Two year comparison of sevelamer and calcium carbonate effects on cardiovascular calcification and bone density. Nephrology Dialysis Transplantation 20: 1653-61

Reason for exclusion: Not the population of interest
Assimon MM; Mousa S; Shaker O; Pai AB. The effect of sevelamer hydrochloride and calcium-based phosphate binders on mortality in hemodialysis patients: a need for more research. Consultant Pharmacist 2010;25(1):41-54

Reason for exclusion: Not received

Babarykin D; Adamsone I; Amerika D; Spudass A; Moisejev V; Berzina N; Michule L; Rozental R. (2004) Calcium-enriched bread for treatment of uremic hyperphosphatemia. Journal of Renal Nutrition 14: 149-56

Reason for exclusion: Not the population of interest

Barna MM; Kapoian T; O'Mara NB. Sevelamer carbonate. Annals of Pharmacotherapy 2010;44 (1) (pp 127-134)-(2010. Date of Publication: January 2010.)

Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not a systematic review of RCTs

Barreto DV; Barreto FC; de Carvalho AB; Cuppari L; Draibe SA; Dalboni MA; Moyses RM; Neves KR; Jorgetti V; Miname M; Santos RD; Canziani ME. (2008) Phosphate binder impact on bone remodeling and coronary calcification - results from the BRiC study. Nephron 110: c273-c283

Reason for exclusion: Not the population of interest
Barton Pai A; Conner TA. Therapeutic use of the phosphate binder lanthanum carbonate. Expert Opinion On Drug Metabolism & Toxicology 2009;5(1):71-81

Reason for exclusion: Not a systematic review of RCTs

Barton Pai A; Conner TA; McQuade CR. Therapeutic use of the phosphate binder lanthanum carbonate. Expert Opinion On Drug Metabolism & Toxicology 2009;5(1):71-81

Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not a systematic review of RCTs

Ben Hamida F; el Esper I; Compagnon M; Moriniere P; Fournier A. Long-term (6 months) cross-over comparison of calcium acetate with calcium carbonate as phosphate binder. Nephron 1993;63(3):258-62

Reason for exclusion: Not an RCT
Biagini M; Malaguti M; Sicoli R; Capece R; Friggi A; Ciaffi G; Bargagna R. Treatment of uraemic hyperphosphatemia with calcium acetate: a safe alternative to calcium carbonate. Biomaterials, Artificial Cells, & Immobilization Biotechnology 1992;20(5):1193-99

Reason for exclusion: Not an RCT

Birck R; Zimmermann E; Wassmer S; Nowack R; van der Woude FJ. Calcium ketoglutarate versus calcium acetate for treatment of hyperphosphataemia in patients on maintenance haemodialysis: a cross-over study. Nephrology Dialysis Transplantation 1999;14(6):1475-79

Reason for exclusion: Intervention not relevant


Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Data not extractable

Block GA; Brillhart SL; Persky MS; Amer A; Slade AJ. Efficacy and safety of SBR759, a new iron-based phosphate binder. Kidney International 2010;77(10):897-903

NICE clinical guideline 157 – hyperphosphataemia in chronic kidney disease (appendices C and D)
Reason for exclusion: Not an RCT


Reason for exclusion: Not relevant

Block GA; Spiegel DM; Ehrlich J; Mehta R; Lindbergh J; Dreisbach A; Raggi P. (2005) Effects of sevelamer and calcium on coronary artery calcification in patients new to hemodialysis. Kidney International 68: 1815-24

Reason for exclusion: Not the population of interest

Boaz M; Katzir Z; Schwartz D; Gafter U; Biro A; Shtendik L et al. Effect of sevelamer hydrochloride exposure on carotid intima media thickness in hemodialysis patients. Nephron 2011;117(2):c83-88

Reason for exclusion: Not an RCT

Bolasco P. Effects of the Use of Non-Calcium Phosphate Binders in the Control and Outcome of Vascular Calcifications: A Review of Clinical Trials on CKD Patients. International Journal of Nephrology 2011;2011:758450

Reason for exclusion: Not a systematic review of RCTs

Reason for exclusion: No outcomes of interest

Borrego J; P'rez del Barrio P; Serrano P; Garcia Cort's MJ; Synchez Perales MC; Borrego FJ et al. [A comparison of phosphorus-chelating effect of calcium carbonate versus calcium acetate before dialysis]. Nefrolog-a : publicaciòn oficial de la Sociedad Espaïola Nefrologia 2000;20(4):348-54

Reason for exclusion: Non English language


Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not an RCT


Reason for exclusion: Not a systematic review of RCTs
Brandi L; Daugaard H; Nielsen PK; Jensen LT; Egsmose C; Olgaard K. Long-term effects of intravenous 1 alpha (OH)D3 combined with CaCO3 and low-calcium dialysis on secondary hyperparathyroidism and biochemical bone markers in patients on chronic hemodialysis. Nephron 1996;74(1):89-103

Reason for exclusion: Not an RCT

Braun J; Asmus HG; Holzer H; Brunkhorst R; Krause R; Schulz W; Neumayer HH; Raggi P; Bommer J. (2004) Long-term comparison of a calcium-free phosphate binder and calcium carbonate--phosphorus metabolism and cardiovascular calcification. Clinical Nephrology 62: 104-15

Reason for exclusion: Not the population of interest

Brennan A; Akehurst R; Davis S; Sakai H; Abbott V. The cost-effectiveness of lanthanum carbonate in the treatment of hyperphosphatemia in patients with end-stage renal disease. Value in Health 2007;10(1):32-41

Reason for exclusion: Not relevant

Bro S; Rasmussen RA; Handberg J; Olgaard K; Feldt-Rasmussen B. Randomized crossover study comparing the phosphate-binding efficacy of calcium ketoglutarate versus calcium carbonate in patients on chronic hemodialysis. American Journal of Kidney Diseases 1998;31(2):257-62

Reason for exclusion: Intervention not relevant

Brophy DF; Wallace JF; Kennedy DT; Gehr TW; Holdford DA. Cost-effectiveness of sevelamer versus calcium carbonate plus atorvastatin to

Reason for exclusion: Not an RCT


Reason for exclusion: Not relevant

Budoff MJ; Kessler P; Gao YL; Qunibi W; Moustafa M; Mao SS. The interscan variation of CT coronary artery calcification score: analysis of the Calcium Acetate Renagel Comparison (CARE)-2 study. Academic Radiology 2008;15(1):58-61

Reason for exclusion: Not relevant


Reason for exclusion: Not a systematic review of RCTs

Burke SK; Dillon MA; Hemken DE; Rezabek MS. Meta-analysis of the effect of sevelamer on phosphorus, calcium, PTH, and serum lipids in dialysis patients. Advances in Renal Replacement Therapy 2003;10(2):133-45

Reason for exclusion: Not a systematic review of RCTs

Burke SK; Dillon MA; Hemken DE; Rezabek MS; Balwit J.M. Meta-analysis of the effect of sevelamer on phosphorus, calcium, PTH, and serum lipids in NICE clinical guideline 157 – hyperphosphataemia in chronic kidney disease (appendices C and D)
dialysis patients. Advances in Renal Replacement Therapy 2003;10(2):133-45
Reason for exclusion: Not a systematic review of RCTs

Canavese C; Mereu C; Nordio M; Sabbioni E; Aime S. Blast from the past: the aluminum's ghost on the lanthanum salts. Current Medicinal Chemistry 2005;12(14):1631-36
Reason for exclusion: Not a systematic review of RCTs

Cancela AL; Oliveira RB; Graciolli FG; Dos Reis LM; Barreto F; Barreto DV et al. Fibroblast growth factor 23 in hemodialysis patients: effects of phosphate binder, calcitriol and calcium concentration in the dialysate. Nephron 2011;117(1):c74-82
Reason for exclusion: Relevant outcomes reported as part of another publication

Caravaca F; Santos I; Cubero JJ; Esparrago JF; Arrobas M; Pizarro JL et al. Calcium acetate versus calcium carbonate as phosphate binders in hemodialysis patients. Nephron 1992;60(4):423-27
Reason for exclusion: Not received

Chang JM; Hwang SJ; Tsai JC; Chen HC; Guh JY; Lai YH. Effect of ferric polymaltose complex as a phosphate binder in haemodialysis patients. Nephrology Dialysis Transplantation 1999;14(4):1045-47
Reason for exclusion: Intervention not relevant

Reason for exclusion: Not a systematic review of RCTs

Chertow GM; Burke SK; Dillon MA; Slatopolsky E. Long-term effects of sevelamer hydrochloride on the calcium x phosphate product and lipid profile of haemodialysis patients. Nephrology Dialysis Transplantation 1999;14(12):2907-14

Reason for exclusion: Not an RCT

Chertow GM; Dillon M; Burke SK; Steg M; Bleyer AJ; Garrett BN; et al. A randomized trial of sevelamer hydrochloride (RenaGel) with and without supplemental calcium. Strategies for the control of hyperphosphatemia and hyperparathyroidism in hemodialysis patients. Clinical Nephrology 1999;51(1):18-26

Reason for exclusion: Not relevant

Chertow GM; Dillon MA; Amin N; Burke SK. Sevelamer with and without calcium and vitamin D: observations from a long-term open-label clinical trial. Journal of Renal Nutrition 2000;10(3):125-32

Reason for exclusion: Not an RCT
Chertow GM; Raggi P; Chasan-Taber S; Bommer J; Holzer H; Burke SK. Determinants of progressive vascular calcification in haemodialysis patients. Nephrology Dialysis Transplantation 2004;19(6):1489-96

Reason for exclusion: Relevant outcomes reported as part of another publication

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Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not an RCT


Reason for exclusion: Not received
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Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not the population of interest

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Reason for exclusion: Not an RCT
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Reason for exclusion: Data not extractable


Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Relevant outcomes reported as part of another publication

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Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Not received

Reason for exclusion: Data not extractable


Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Relevant outcomes reported as part of another publication


Reason for exclusion: Not relevant


Reason for exclusion: Relevant outcomes reported as part of another publication

Reason for exclusion: Not the population of interest

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Reason for exclusion: Not an RCT


Reason for exclusion: Relevant outcomes reported as part of another publication

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Reason for exclusion: Not a systematic review of RCTs
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Reason for exclusion: Not the population of interest

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Reason for exclusion: Not the population of interest


Reason for exclusion: Intervention not relevant

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Reason for exclusion: Intervention not relevant

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Reason for exclusion: Not relevant


Reason for exclusion: Data not extractable

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Reason for exclusion: Not the population of interest

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Reason for exclusion: Not a systematic review of RCTs

Reason for exclusion: Data not extractable


Reason for exclusion: Not an RCT

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Reason for exclusion: Not received

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Reason for exclusion: Not a systematic review of RCTs
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Reason for exclusion: Non English language

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Reason for exclusion: Not received


Reason for exclusion: Not an RCT


Reason for exclusion: Not an RCT

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Reason for exclusion: Not the population of interest

Reason for exclusion: Not the population of interest


Reason for exclusion: Not an RCT


Reason for exclusion: Not the population of interest

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Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Not the population of interest


Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not a systematic review of RCTs

Reason for exclusion: Not the population of interest

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Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Data not extractable


Reason for exclusion: No outcomes of interest

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Reason for exclusion: Not an RCT


Reason for exclusion: Relevant outcomes reported as part of another publication

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Reason for exclusion: Not the population of interest

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Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Not an RCT


Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: The review does not match the review criteria

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Reason for exclusion: Data not extractable
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Reason for exclusion: The review does not match the review criteria

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Reason for exclusion: Not an RCT

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Reason for exclusion: Not relevant


Reason for exclusion: Not the population of interest
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Reason for exclusion: Data not extractable

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Reason for exclusion: Data not extractable


Reason for exclusion: Not received

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Reason for exclusion: Not an RCT

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Reason for exclusion: Not an RCT

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Reason for exclusion: Not an RCT

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Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not the population of interest


Reason for exclusion: Not an RCT

Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not an RCT


Reason for exclusion: Data not extractable


Reason for exclusion: Not received


Reason for exclusion: Not a systematic review of RCTs
Review question 4: Use of phosphate binders in people with stage 5 CKD who are on dialysis

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Reason for exclusion: Not an RCT


Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Data not extractable

Reason for exclusion: Intervention not relevant


Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not a systematic review of RCTs

Arest' N; Amor J; Cambil T; Salgueira M; Sÿnchez-Palencia R; Pÿez C et al. [Early treatment of secondary hyperparathyroidism in moderate renal insufficiency: low-phosphorus diet versus calcium carbonate]. Nefrolog-a : publicaciòn oficial de la Sociedad Española Nefrologia 2003;23 Suppl 2:64-68

Reason for exclusion: Not received
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Reason for exclusion: Not received

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Reason for exclusion: Not a systematic review of RCTs


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Reason for exclusion: Not a systematic review of RCTs

Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Not an RCT

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Reason for exclusion: Not an RCT

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Reason for exclusion: Intervention not relevant

Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Data not extractable

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Reason for exclusion: Not an RCT


Reason for exclusion: Not relevant

Boaz M; Katzir Z; Schwartz D; Gafter U; Biro A; Shtendik L et al. Effect of sevelamer hydrochloride exposure on carotid intima media thickness in hemodialysis patients. Nephron 2011;117(2):c83-88
Reason for exclusion: Not an RCT

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Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: No outcomes of interest

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Reason for exclusion: Non English language


Reason for exclusion: Not a systematic review of RCTs

Reason for exclusion: Not an RCT


Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Not an RCT

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Reason for exclusion: Not relevant

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Reason for exclusion: Intervention not relevant
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Reason for exclusion: Not an RCT


Reason for exclusion: Not relevant

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Reason for exclusion: Not relevant


Reason for exclusion: Not a systematic review of RCTs

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Reason for Exclusion: Not the population of interest

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Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Relevant outcomes reported as part of another publication
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Reason for exclusion: Not received

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Reason for exclusion: Intervention not relevant


Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Not an RCT

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Reason for exclusion: Not an RCT

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Reason for exclusion: Relevant outcomes reported as part of another publication

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Reason for exclusion: Not an RCT


Reason for exclusion: Not the population of interest

Reason for exclusion: Not a systematic review of RCTs

Collins AJ; St Peter WL; Dalleska FW; Ebben JP; Ma JZ. Hospitalization risks between Renagel phosphate binder treated and non-Renagel treated patients. Clinical Nephrology 2000;54(4):334-41

Reason for exclusion: Not an RCT


Reason for exclusion: Data not extractable


Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not a systematic review of RCTs
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Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Not an RCT

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Reason for exclusion: Data not extractable

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Reason for exclusion: Intervention not relevant
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Reason for exclusion: Not a systematic review of RCTs

Delmez J; Block G; Robertson J; Chasan-Taber S; Blair A; Dillon M; Bleyer AJ. A randomized, double-blind, crossover design study of sevelamer hydrochloride and sevelamer carbonate in patients on hemodialysis. Clinical Nephrology 2007;68(6):386-91

Reason for exclusion: Data not extractable


Reason for exclusion: Data not extractable

Deuber HJ. [Combined use of calcium acetate and magnesium carbonate as phosphate binder]. Nieren-und Hochdruckkrankheiten 2004;33(8):403-08

Reason for exclusion: Non English language

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Reason for exclusion: Relevant outcomes reported as part of another publication

Di Iorio B; Cucciniello E. Lanthanum carbonate is not associated with QT interval modification in hemodialysis patients. Clinical Pharmacology: Advances and Applications 2010;2 (1) (pp 89-93)-(2010. Date of Publication: 2010.)

Reason for exclusion: Not an RCT

Di Iorio BR; Cucciniello E; Bellizzi V. Vascular calcification and QT interval in incident hemodialysis patients. Journal of Nephrology 2009;22(6):694-98

Reason for exclusion: Not relevant


Reason for exclusion: Not a systematic review of RCTs

Duggal A; Hanus M; Zhorov E; Dagher R; Plone MA; Goldberg J; Burke SK. Novel dosage forms and regimens for sevelamer-based phosphate binders. Journal of Renal Nutrition 2006;16(3):248-52

Reason for exclusion: Not a systematic review of RCTs

Eastwood JB; Bordier P; de Wardener HE. Comparison of the effect of vitamin D and calcium carbonate in renal osteomalacia. Quarterly Journal of Medicine 1971;40(160):569-70
Reason for exclusion: Not an RCT


Reason for exclusion: Not relevant


Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Data not extractable

Fatica RA; Dennis VW. Cardiovascular mortality in chronic renal failure: hyperphosphatemia, coronary calcification, and the role of phosphate binders. Cleveland Clinic Journal of Medicine 2002;69:Suppl-7
Reason for exclusion: Not a systematic review of RCTs

Ferramosca E; Burke S; Chasan-Taber S; Ratti C; Chertow GM; Raggi P. Potential antiatherogenic and anti-inflammatory properties of sevelamer in maintenance hemodialysis patients. American Heart Journal 2005;149(5):820-25

Reason for exclusion: Relevant outcomes reported as part of another publication

Filiopoulos V; Koutis I; Trompouki S; Hadjiyannakos D; Lazarou D; Vlassopoulos D. Lanthanum Carbonate Versus Sevelamer Hydrochloride: Improvement of Metabolic Acidosis and Hyperkalemia in Hemodialysis Patients. Therapeutic Apheresis and Dialysis 2011;15(1):20-27

Reason for exclusion: Not an RCT

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Reason for exclusion: Not an RCT

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Reason for exclusion: Data not extractable

NICE clinical guideline 157 – hyperphosphataemia in chronic kidney disease (appendices C and D)

Reason for exclusion: Non English language

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Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Data not extractable

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Reason for exclusion: Non English language


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Reason for exclusion: No outcomes of interest

Geary DF; Hodson EM; Craig JC. Interventions for bone disease in children with chronic kidney disease. Cochrane Database of Systematic Reviews 2010;(1):CD008327

Reason for exclusion: Not relevant

Reason for exclusion: Not an RCT

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Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Not an RCT

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Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Not relevant


Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not the population of interest

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Reason for exclusion: No outcomes of interest

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Reason for exclusion: Not an RCT

Reason for exclusion: Not relevant

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Reason for exclusion: Not relevant


Reason for exclusion: Not relevant


Reason for exclusion: Not an RCT

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Reason for exclusion: Not the population of interest

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Reason for exclusion: Not the population of interest


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Reason for exclusion: The review does not match the review criteria

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Reason for exclusion: Not received

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Reason for exclusion: Not an RCT


Reason for exclusion: Intervention not relevant


Reason for exclusion: Not an RCT

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Reason for exclusion: Not relevant

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Reason for exclusion: Relevant outcomes reported as part of another publication

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Reason for exclusion: Not received

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Reason for exclusion: Not a systematic review of RCTs


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Reason for exclusion: Not an RCT

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Reason for exclusion: Data not extractable


Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: The review does not match the review criteria

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Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Not the population of interest

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Reason for exclusion: Intervention not relevant

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Reason for exclusion: Not an RCT

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Reason for exclusion: Not an RCT

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Reason for exclusion: The review does not match the review criteria

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Reason for exclusion: The review does not match the review criteria

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Reason for exclusion: Not the population of interest

Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not a systematic review of RCTs

Reason for exclusion: Not an RCT


Reason for exclusion: Not received

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Reason for exclusion: Not an RCT

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Reason for exclusion: Data not extractable


Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Relevant outcomes reported as part of another publication

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Reason for exclusion: Data not extractable

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Reason for exclusion: Not received


Reason for exclusion: Data not extractable


Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Relevant outcomes reported as part of another publication

Reason for exclusion: Not relevant

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Reason for exclusion: Relevant outcomes reported as part of another publication

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Reason for exclusion: Not the population of interest

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Reason for exclusion: Not an RCT

Reason for exclusion: Relevant outcomes reported as part of another publication

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Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Intervention not relevant

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Reason for exclusion: Not the population of interest

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Reason for exclusion: Not relevant


Reason for exclusion: Data not extractable

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Reason for exclusion: Not an RCT

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Reason for exclusion: Not a systematic review of RCTs

Reason for exclusion: Data not extractable


Reason for exclusion: Not an RCT

S'chet A; Abighanem O; Said S; Rasombololona M; MoriniSre P; Brazier M; Fournier A. [Inhibition of gastric secretion by omeprazole and efficacy of calcium carbonate in the control of hyperphosphatemia in patients on maintenance hemodialysis]. Nephrologie 1999;20(4):213-16

Reason for exclusion: Not received

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Reason for exclusion: Not received


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Sechet A; Abighanem O; Said S; Rasombololona M; Moriniere Ph; Brazier M; Fournier A. Inhibition of gastric secretion by omeprazole and efficiency of calcium carbonate in controlling hyperphosphatemia in patients on maintenance dialysis. Nephrologie 1999;20(4):213-16

Reason for exclusion: Non English language

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Reason for exclusion: Not received


Reason for exclusion: Not an RCT


Reason for exclusion: Not an RCT


Reason for exclusion: Not an RCT

Reason for exclusion: Not the population of interest

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Reason for exclusion: Not received


Reason for exclusion: Not a systematic review of RCTs


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Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Data not extractable


Reason for exclusion: Not the population of interest

Reason for exclusion: No outcomes of interest


Reason for exclusion: Not an RCT


Reason for exclusion: Relevant outcomes reported as part of another publication


Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Not received

Reason for exclusion: Not a systematic review of RCTs

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Reason for exclusion: Not an RCT


Reason for exclusion: Not a systematic review of RCTs

Tonelli M; Wiebe N; Culleton B; Lee H; Klarenbach S; Shrive F et al. Systematic review of the clinical efficacy and safety of sevelamer in dialysis patients. Nephrology Dialysis Transplantation 2007;22(10):2856-66

Reason for exclusion: The review does not match the review criteria

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Reason for exclusion: The review does not match the review criteria

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Reason for exclusion: Not an RCT


Reason for exclusion: Not relevant

van den Bergh JP; Gelens MA; Klaassen HA; Kaufmann BG; Bottger WM; Verstappen VM. Efficacy and tolerance of three different calcium acetate formulations in hemodialysis patients. Netherlands Journal of Medicine 1999;55(5):222-28

Reason for exclusion: Data not extractable
van den Bergh JP; Kaufmann BG; van Riet GJ; Bottger WM; Verstappen VM. Comparison of three formulations of calcium acetate tablets to evaluate tolerance and control of hyperphosphatemia in patients with chronic renal failure. Nephron 1994;68(4):505-06

Reason for exclusion: Data not extractable


Reason for exclusion: Not received

Vemuri N; Michelis MF; Matalon A. Conversion to lanthanum carbonate monotherapy effectively controls serum phosphorus with a reduced tablet burden: a multicenter open-label study. BMC Nephrology 2011;12:49

Reason for exclusion: Not an RCT

Vlahakos DV; Retsa K; Kalogeropoulou S; Katsoudas S; Bacharaki D; Agroyannis B. Chronic acid-base perturbations in hemodialysis patients treated with sevelamer hydrochloride: a two-year follow-up study. Artificial Organs 2007;31(12):892-95

Reason for exclusion: Not an RCT

Vucelic B; Hadzic N; Gragas J; Puretic Z. Changes in serum phosphorus, calcium and alkaline phosphatase due to sucralfate. International Journal of Clinical Pharmacology, Therapy, & Toxicology 1986;24(2):93-96

Reason for exclusion: Not an RCT
Wasan SM; Godley PJ. Phosphate binders in hyperphosphatemia of chronic renal failure. DICP 1991;25(9):942-45

Reason for exclusion: Not a systematic review of RCTs


Reason for exclusion: Not an RCT


Reason for exclusion: Not a systematic review of RCTs

Yamada K; Fujimoto S; Tokura T; Fukudome K; Ochiai H; Komatsu H et al. Effect of sevelamer on dyslipidemia and chronic inflammation in maintenance hemodialysis patients. Renal Failure 2005;27(4):361-65

Reason for exclusion: Not an RCT

Yang WC; Yang CS; Hou CC; Wu TH; Young EW; Hsu CH. An open-label, crossover study of a new phosphate-binding agent in haemodialysis patients: ferric citrate. Nephrology Dialysis Transplantation 2002;17(2):265-70

Reason for exclusion: Data not extractable
Reason for exclusion: Not received

Reason for exclusion: Not a systematic review of RCTs

Zhang Q; Li M; Lu Y; Li H; Gu Y; Hao C; Chen J. Meta-analysis comparing sevelamer and calcium-based phosphate binders on cardiovascular calcification in hemodialysis patients. Nephron 2010;115(4):c259-67
Reason for exclusion: The review does not match the review criteria

Reason for exclusion: Not an RCT

**Review question 6: Use of supplements in people with stage 4 or 5 CKD who are not on dialysis**
Ali AA; Ali KE; Fadlalla AE; Khalid KE. The effects of gum arabic oral treatment on the metabolic profile of chronic renal failure patients under regular haemodialysis in Central Sudan. Natural Product Research 2008;22(1):12-21

Reason for exclusion: Supplement was not administered for the purpose of managing hyperphosphataemia

Berns JS. Niacin and related compounds for treating hyperphosphatemia in dialysis patients. Seminars in Dialysis 2008;21(3):203-05

Reason for exclusion: Not a systematic review of RCTs

Bostom AG; MacLean AA; Maccubbin D; Tipping D; Giezek H; Hanlon WA. Extended-release niacin/laropiprant lowers serum phosphorus concentrations in patients with type 2 diabetes. Journal of Clinical Lipidology 2011;5(4):281-87
Reason for exclusion: Not the population of interest

Cheng SC; Young DO; Huang Y; Delmez JA; Coyne DW. A randomized, double-blind, placebo-controlled trial of niacinamide for reduction of phosphorus in hemodialysis patients. Clinical Journal of The American Society of Nephrology: CJASN 2008;3(4):1131-38

Reason for exclusion: Crossover trial did not report each groups’ results separately (i.e. merged by intervention)

Chertow GM; Dillon M; Burke SK; Steg M; Bleyer AJ; Garrett BN; Domoto DT; Wilkes BM; Wombolt DG; Slatopolsky E. A randomised trial of sevelamer hydrochloride (RenaGel) with and without supplemental calcium. Clinical Nephrology 51(1): 18-26 (1999)

Reason for exclusion: Not the population of interest

Cibulka R; Racek J; Pikner R; Rajdl D; Trefil L; Vesala E; Studenovska M; Siroka R. Effect of L-carnitine supplementation on secondary hyperparathyroidism and bone metabolism in hemodialyzed patients. Calcified Tissue International 81: 99-106 (2007)

Reason for exclusion: Not the population of interest

Delanaye P; Weekers L; Krzesinski JM. Diarrhea induced by high doses of nicotinamide in dialysis patients. Kidney International 2006;69(10):1914

Reason for exclusion: Not an RCT

Reason for exclusion: Not a systematic review of RCTs

Fouque D; McKenzie J; de Mutsert R; Azar R; Teta D; Plauth M et al. Use of a renal-specific oral supplement by haemodialysis patients with low protein intake does not increase the need for phosphate binders and may prevent a decline in nutritional status and quality of life. Nephrology Dialysis Transplantation 2008;23(9):2902-10

Reason for exclusion: Not relevant

Kooienga L; Fried L; Scragg R; Kendrick J; Smits G; Chonchol M. The effect of combined calcium and vitamin D3 supplementation on serum intact parathyroid hormone in moderate CKD. American Journal of Kidney Diseases 2009;53(3):408-16

Reason for exclusion: Population includes people with less severe stages of CKD than stages 4 or 5


Reason for exclusion: Not the population of interest

Makoff R. Vitamin supplementation in patients with renal disease. Dialysis and Transplantation 1992;21 (1) (pp 18-21+24+36)
Reason for exclusion: Paper not available

Rudnicki M; Hojsted J; Petersen LJ; Sorensen HA; Hyldstrup L; Transbol I. Oral calcium effectively reduces parathyroid hormone levels in hemodialysis patients: a randomized double-blind placebo-controlled study. Nephron 1993;65(3):369-74

Reason for exclusion: Not the intervention of interest (phosphate binder)

Rudnicki M; Hyldstrup L; Petersen LJ; Hojsted J; Transbol I. Effect of oral calcium on noninvasive indices of bone formation and bone mass in hemodialysis patients: a randomized double-blind placebo-controlled study. Mineral & Electrolyte Metabolism 1994;20(3):130-34

Reason for exclusion: Not the intervention of interest (phosphate binder)


Reason for exclusion: Not a systematic review of RCTs

Sampathkumar K; Selvam M; Sooraj YS; Gowthaman S; Ajeshkumar RN. Extended release nicotinic acid - a novel oral agent for phosphate control. International Urology & Nephrology 2006;38(1):171-74

Reason for exclusion: Not an RCT
Shahbazian H; Zafar Mohtashami A; Ghorbani A; Abbaspour MR; Belladi Musavi SS; Hayati F; Lashkarara GR. Oral niacinamide reduces serum phosphate, increases HDL, and induces thrombocytopenia in hemodialysis patients: a double-blind randomised controlled trial. Nefrologia 31(1): 58-65 (2011)

Reason for exclusion: Not the population of interest

Takahashi Y; Tanaka A; Nakamura T; Fukuwatari T; Shibata K; Shimada N et al. Nicotinamide suppresses hyperphosphatemia in hemodialysis patients. Kidney International 2004;65(3):1099-1004

Reason for exclusion: Not an RCT

Wang L; Manson JE; Song Y; Sesso HD. Systematic review: Vitamin D and calcium supplementation in prevention of cardiovascular events. Annals of Internal Medicine 2010;152(5):315-23

Reason for exclusion: Not a systematic review of RCTs only

Young DO; Cheng SC; Delmez JA; Coyne DW. The effect of oral niacinamide on plasma phosphate levels in peritoneal dialysis patients. Peritoneal Dialysis International 29: 562-7 (2009)

Reason for exclusion: Not the population of interest

Review question 7: Use of supplements in people with stage 5 CKD who are on dialysis
Ali AA; Ali KE; Fadlalla AE; Khalid KE. The effects of gum arabic oral treatment on the metabolic profile of chronic renal failure patients under regular haemodialysis in Central Sudan. Natural Product Research 2008;22(1):12-21

Reason for exclusion: Supplement was not administered for the purpose of managing hyperphosphataemia

Berns JS. Niacin and related compounds for treating hyperphosphatemia in dialysis patients. Seminars in Dialysis 2008;21(3):203-05

Reason for exclusion: Not a systematic review of RCTs

Bostom AG; MacLean AA; Maccubbin D; Tipping D; Giezek H; Hanlon WA. Extended-release niacin/laropiprant lowers serum phosphorus concentrations in patients with type 2 diabetes. Journal of Clinical Lipidology 2011;5(4):281-87

Reason for exclusion: Not the population of interest
Cheng SC; Young DO; Huang Y; Delmez JA; Coyne DW. A randomized, double-blind, placebo-controlled trial of niacinamide for reduction of phosphorus in hemodialysis patients. Clinical Journal of The American Society of Nephrology: CJASN 2008;3(4):1131-38

Reason for exclusion: Crossover trial did not report each groups’ results separately (i.e. merged by intervention)

Delanaye P; Weekers L; Krzesinski JM. Diarrhea induced by high doses of nicotinamide in dialysis patients. Kidney International 2006;69(10):1914

Reason for exclusion: Not an RCT


Reason for exclusion: Not a systematic review of RCTs

Fouque D; McKenzie J; de Mutsert R; Azar R; Teta D; Plauth M et al. Use of a renal-specific oral supplement by haemodialysis patients with low protein intake does not increase the need for phosphate binders and may prevent a decline in nutritional status and quality of life. Nephrology Dialysis Transplantation 2008;23(9):2902-10

Reason for exclusion: Not relevant

Kooienga L; Fried L; Scrugg R; Kendrick J; Smits G; Chonchol M. The effect of combined calcium and vitamin D3 supplementation on serum intact
parathyroid hormone in moderate CKD. American Journal of Kidney Diseases 2009;53(3):408-16

Reason for exclusion: Population includes people with less severe stages of CKD than stages 4 or 5


Reason for exclusion: Not the population of interest

Makoff,R. Vitamin supplementation in patients with renal disease. Dialysis and Transplantation 1992;21 (1) (pp 18-21+24+36)

Reason for exclusion: Paper not available

Rudnicki M; Hojsted J; Petersen LJ; Sorensen HA; Hyldstrup L; Transbol I. Oral calcium effectively reduces parathyroid hormone levels in hemodialysis patients: a randomized double-blind placebo-controlled study. Nephron 1993;65(3):369-74

Reason for exclusion: Not the intervention of interest (phosphate binder)

Rudnicki M; Hyldstrup L; Petersen LJ; Hojsted J; Transbol I. Effect of oral calcium on noninvasive indices of bone formation and bone mass in hemodialysis patients: a randomized double-blind placebo-controlled study. Mineral & Electrolyte Metabolism 1994;20(3):130-34

Reason for exclusion: Not the intervention of interest (phosphate binder)

Reason for exclusion: Not a systematic review of RCTs

Sampathkumar K; Selvam M; Sooraj YS; Gowthaman S; Ajeshkumar RN. Extended release nicotinic acid - a novel oral agent for phosphate control. International Urology & Nephrology 2006;38(1):171-74

Reason for exclusion: Not an RCT

Shahbazian H; Zafar Mohtashami A; Ghorbani A; Abbaspour MR; Belladi Musavi SS; Hayati F; Lashkarara GR. Oral niacinamide reduces serum phosphate, increases HDL, and induces thrombocytopenia in hemodialysis patients: a double-blind randomised controlled trial. Nefrologia 31(1): 58-65 (2011)

Reason for exclusion: Not the population of interest

Takahashi Y; Tanaka A; Nakamura T; Fukuwatari T; Shibata K; Shimada N et al. Nicotinamide suppresses hyperphosphatemia in hemodialysis patients. Kidney International 2004;65(3):1099-1004

Reason for exclusion: Not an RCT

Wang L; Manson JE; SongY; Sesso HD. Systematic review: Vitamin D and calcium supplementation in prevention of cardiovascular events. Annals of Internal Medicine 2010;152(5):315-23
Reason for exclusion: Not a systematic review of RCTs only

Review question 8: Sequencing of treatments


Reason for exclusion: abstract only

Ando R; Naito S; Inagaki Y; Hata T; Ishida Y; Chida Y; Takayama M; Tachibana K; Ohtsuka M; Inoue A. (2005) The influence of dialysate calcium on the therapeutic effects of sevelamer hydrochloride in hemodialysis patients with secondary hyperparathyroidism under treatment of intravenous vitamin D metabolites. Therapeutic Apheresis & Dialysis: Official Peer-Reviewed Journal
of the International Society for Apheresis, the Japanese Society for Apheresis, the Japanese Society for Dialysis Therapy 9: 16-23 [ref ID: 12574]

Reason for exclusion: not relevant (no sequencing of treatments)


Reason for exclusion: wrong design (narrative review)

Brunori G; Viola BF; Parrinello G; De Biase V; Como G; Franco V; Garibotto G; Zubani R; Cancarini GC. (2007) Efficacy and safety of a very-low-protein diet when postponing dialysis in the elderly: a prospective randomized multicenter controlled study. American Journal of Kidney Diseases 49: 569-80 [ref ID: 9266]

Reason for exclusion: not relevant (no sequencing of treatments)


Reason for exclusion: not a full report of the trial (commentary only)


Reason for exclusion: not relevant

Reason for exclusion: wrong design (narrative review)

Goto S; Komaba H; Moriwaki K; Fujimori A; Shibuya K; Nishioka M; Kim JI; Yoshiya K; Shin J; Hasegawa H; Taniguchi M; Fujii H; Nishi S; Kamae I; Fukagawa M. (2011) Clinical efficacy and cost-effectiveness of lanthanum carbonate as second-line therapy in hemodialysis patients in Japan. Clinical Journal of The American Society of Nephrology: CJASN 6: 1375-84 [ref ID: 12008]

Reason for exclusion: not relevant

Hutchison AJ; Maes B; Vanwalleghem J; Asmus G; Mohamed E; Schmieder R; Backs W; Jamar R; Vosskuhler A. (2006) Long-term efficacy and tolerability of lanthanum carbonate: Results from a 3-year study. Nephron - Clinical Practice 102: c61-c71 [ref ID: 13459]

Reason for exclusion: not relevant (no sequencing of treatments)


Reason for exclusion: not a full report of the trial (commentary only)

Reason for exclusion: not relevant (no sequencing of interventions - cross-sectional study interested more in dosing and treatment delivery)

Joffe P; Podenphant J; Heaf JG. (1989) Bone histology in CAPD patients: a comparison with hemodialysis and conservatively treated chronic uremics. Advances in Peritoneal Dialysis 5: 171-6 [ref ID: 12979]

Reason for exclusion: not relevant


Reason for exclusion: wrong population (includes CKD 2 and 3)


Reason for exclusion: wrong design (narrative review)

Yokum D; Glass G; Cheung CF; Cunningham J; Fan S; Madden AM. (2008) Evaluation of a phosphate management protocol to achieve optimum serum phosphate levels in hemodialysis patients. Journal of Renal Nutrition 18: 521-9 [ref ID: 2839]

Reason for exclusion: not relevant (more about service delivery/determination of treatment regimen than effectiveness of treatment sequences)