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1 Primary surgical management of
2 anterior pelvic organ prolapse: a
3 systematic review, network meta-
4 analysis and cost-effectiveness
5 analysis
6

7 Running title: Cost-effectiveness of
8 surgical treatments for POP
9

| First and last name | Institutional affiliations | Email address |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Eric Slade, MSc - the corresponding author | National Guideline Alliance, Royal College of Obstetricians and Gynaecologists, 27 Sussex Place, London, NW1 4RG, UK | eslade@rcog.org.uk T: +44 20 7045 6750 |
| Caitlin Daly, MSc | Population Health Sciences, Bristol Medical School, University of Bristol, | c.daly@bristol.ac.uk |
| Ifigeneia Mavranzouli, PhD | Research Department of Clinical, Educational & Health Psychology, University College London, 1-19 Torrington Place, London, WC1E 7HB National Guideline Alliance, Royal College of Obstetricians and Gynaecologists, 27 Sussex Place, London, NW1 4RG, UK | i.mavranzouli@ucl.ac.uk |
| Sofia Dias, PhD | Centre for Reviews and Dissemination, University of | sofia.dias@york.ac.uk |

| | | |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| | <p>York, Heslington, York YO10 5DD</p> <p>Population Health Sciences, Bristol Medical School, University of Bristol, Canyng Hall, 39 Whatley Road, Bristol BS8 2PS</p> | |
| Dr Rohna Kearney | <p>a The Warrell Unit, St. Mary's Hospital, Manchester University Hospitals NHS Foundation Trust, Manchester Academic Health Science Centre, Manchester, M13 9WL, United Kingdom</p> <p>b University Institute of Human Development, Faculty of Medical Human Sciences, University of Manchester, United Kingdom</p> | Rohna.Kearney@mft.nhs.uk |
| Dr Karen Ward | <p>a The Warrell Unit, St. Mary's Hospital, Manchester University Hospitals NHS Foundation Trust, Manchester Academic Health Science Centre, Manchester, M13 9WL, United Kingdom</p> | Karen.Ward@mft.nhs.uk |
| Elise Hasler, BSc Econ Hons, MCLIP | <p>National Guideline Alliance, Royal College of Obstetricians and Gynaecologists, 27 Sussex Place, London, NW1 4RG, UK</p> | EHasler@RCOG.ORG.UK |
| Patrice Carter, PhD | <p>Research Department of Clinical, Educational & Health Psychology, University College London, 1-19 Torrington Place, London, WC1E 7HB</p> <p>National Guideline Alliance, Royal College of Obstetricians and Gynaecologists, 27 Sussex</p> | Patrice.carter@ucl.ac.uk |

| | | |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| | Place, London, NW1 4RG, UK | |
| Dr Charlotte Mahoney | Manchester University Hospitals NHS Foundation Trust | Charlotte.Mahoney@mft.nhs.uk |
| Fergus Macbeth | Centre for Trials Research, Cardiff University, 6th Floor, Neuadd Meirionnydd, Heath Park, Cardiff. CF14 4YS | Fergus.macbeth@btinternet.com |
| Vanessa Delgado Nunes, MSc | National Guideline Alliance, Royal College of Obstetricians and Gynaecologists, 27 Sussex Place, London, NW1 4RG, UK | VNunes@RCOG.ORG.UK |

1 **Abstract**

2 **Background.** Anterior compartment prolapse is the most common pelvic organ
3 prolapse (POP) with a range of surgical treatment options available.

4 **Objectives.** To compare the clinical and cost effectiveness of surgical treatments for the
5 repair of anterior POP.

6 **Methods.** We conducted a systematic review of randomised controlled trials (RCTs)
7 comparing surgical treatments for women with POP. Network meta-analysis (NMA) was
8 possible for anterior POP, same site recurrence outcome. A Markov model was used to
9 compare the cost–utility of surgical treatments for the primary repair of anterior POP
10 from a UK National Health Service perspective.

11 **Main results.** We identified 27 eligible trials for the NMA involving eight surgical
12 treatments tested on 3,194 women. Synthetic mesh was the most effective in preventing
13 recurrence at the same site. There was no evidence to suggest a difference between
14 synthetic non-absorbable mesh, synthetic partially absorbable mesh, and biological
15 mesh. The cost-utility analysis which incorporated effectiveness, complications, and cost
16 data found non-mesh repair to have the highest probability of being cost-effective. The
17 conclusions were robust to model inputs including effectiveness, costs, and utility values.

18 **Conclusions.** Anterior colporrhaphy augmented with mesh appeared to be cost-
19 ineffective in women requiring primary repair of anterior POP. There is a need for further
20 research on long-term effectiveness and the safety of mesh products to establish their
21 relative cost-effectiveness with a greater certainty.

22 **Keywords:** pelvic organ prolapse, anterior prolapse, mesh, network meta-analysis, cost-
23 effectiveness, outcome research, National Institute of Health and Care Excellence.

24 **Tweetable abstract:** New study finds mesh cost-ineffective in women with anterior
25 pelvic organ prolapse

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1 **Introduction**

2 Anterior compartment prolapse is the most common pelvic organ prolapse (POP) with a
3 lifetime risk of surgery estimated between 11-19%.¹ Anterior POP is defined as the
4 descent of the anterior vaginal wall.² Treatments include conservative or surgical
5 options, and depend on symptoms, POP degree, and patient preferences.³

6 Anterior colporrhaphy (AC) is considered the standard surgical treatment but is
7 associated with a significant rate of failure.⁴ Surgery with mesh augmentation was
8 introduced to improve outcomes but there are safety concerns about its use and no data
9 on long-term outcomes.¹ Synthetic meshes may lead to chronic complications needing
10 long-term management. To address these concerns NHS England set up the Mesh
11 Working Group and an independent review of transvaginal mesh implants was
12 undertaken in Scotland.^{5, 6} Mesh products have also been scrutinised by the European
13 Commission (SCENIHR) and US Food and Drug Administration (FDA).^{7, 8}

14 The aim of this work was to evaluate which surgical procedures are the most clinically
15 and cost-effective in women undergoing repair of anterior POP. This analysis was used
16 to inform a national guideline on the management of urinary incontinence and POP in
17 women, released by the National Institute for Health and Care Excellence (NICE) in
18 England.⁹

19 **Methods**

20 **Methods of the systematic review and network meta-analysis**

21 We carried out a systematic review to identify relevant randomised controlled trials
22 (RCTs) using a predefined search strategy (see Appendix S1). The final search date
23 was June 2018. A 10% random sample of the literature search results was screened by
24 a second reviewer against inclusion criteria specified in the review protocol.⁹

1 One reviewer extracted data from the eligible studies, including study characteristics,
2 aspects of methodological quality, outcome data, and risk of bias, which were checked
3 by a second reviewer.¹⁰

4 RCTs on surgical procedures in women with predominantly anterior, primary or
5 secondary repair were included. The critical outcomes in the systematic review were
6 health-related quality of life (HRQoL), adverse events, and complications including
7 recurrence of POP. The recurrence of anterior POP was the only dichotomous outcome
8 that could be synthesised using network meta-analysis (NMA). Data was poorly reported
9 for other outcomes and were insufficient to inform NMA.

10 NMA combines direct and indirect evidence to estimate relative effects between all pairs
11 of interventions in a network, even if some pairs of interventions have not been directly
12 compared in head-to-head trials.¹¹⁻¹⁴ Fixed and random effects NMA models (binomial
13 likelihood and cloglog link) were fitted in a Bayesian framework, using WinBUGS 1.4.3.^{12,}

14 ¹⁵ The goodness-of-fit of each model was assessed and the model with best fit was
15 selected as the base-case NMA model. (See Appendix S2)

16 Relative effects between surgical procedures were expressed as posterior median
17 hazard ratios (HRs) with 95% credible intervals (CrIs). Surgical procedures were also
18 ranked based on their effectiveness, with a rank of 1 representing the best procedure.
19 Median ranks and 95% CrI are presented for each surgical procedure.

20 The suitability of the consistency assumption was assessed by comparing the selected
21 base-case NMA model to an 'inconsistency', or unrelated mean effects, model and by
22 node-splitting.¹⁶⁻¹⁸ (See Appendix S2).

23 **Methods for the cost-effectiveness analysis**

24 We developed a de novo Markov model to estimate the cost-effectiveness of effective
25 surgical procedures over 15 years in adult women who required surgical repair for
26 primary anterior POP using the data obtained from the NMA (see Appendix S3). The
27 model was run in yearly cycles and included the following health states: 'well' (i.e.

1 successfully managed POP), 'failure/recurrence', and 'complications'. The model
2 considered only one recurrence following the primary repair given that few women have
3 more than two repairs.¹⁹

4 ***Clinical inputs***

5 The baseline risk of anatomical recurrence was estimated by combining the probability
6 of surgically managed recurrence derived from a long-term naturalistic study with the
7 probability of anatomical recurrence adjusted for the surgically managed recurrence that
8 was derived from the AC arm of the RCT with the longest available follow-up amongst
9 those included in the systematic review.^{19, 20}

10 This approach was used since the identified naturalistic studies focused only on
11 surgically-managed recurrence and the effectiveness data estimated from the NMA were
12 for anatomical recurrence. Identified long-term rates were used to estimate the annual
13 probabilities of recurrence. Given the uncertainty about how the recurrence risk varies
14 with time, a constant risk was modelled each year for the duration of the model.

15 We applied the HRs from the NMA to the baseline risk for the reference surgical
16 procedure (AC), to obtain absolute probabilities for all surgical treatments. Given that the
17 follow-up times in RCTs included in the NMA were clustered around one to three years
18 the estimated HRs of mesh procedures (versus AC) were applied during the first three
19 years only. After the three years, the risk of recurrence in mesh groups was modelled to
20 be the same as for women receiving AC only.

21 The risk of surgically managed recurrence following a secondary repair was based on an
22 observational cohort study.²¹ This study did not report the anatomical recurrence rate
23 and so this was taken from a UK-based RCT.²² The annual probabilities were estimated
24 as described above for the primary repair.

25 The mortality rate from POP surgery is small (37 per 100,000 cases) and would only
26 make a very small contribution to the health state utility loss because mortality is not
27 expected to vary between surgical procedures and very few women choose to undergo

1 further repairs following POP recurrence.²³ Therefore mortality was not considered in the
2 analysis.

3 **Complications**

4 Surgical complications other than those associated with the mesh itself were not
5 deemed to vary much across arms and were excluded from the analysis. Surgical
6 treatment with mesh is associated with various complications. Given the uncertainty
7 about the long-term incidence of complications, only those assumed to have the greatest
8 impact on HRQoL and costs, including mesh extrusion and pain, were modelled.

9 Rates of mesh extrusion and pain were taken from cohort studies and were used to
10 estimate the annual probabilities attached to the synthetic mesh repairs.^{24, 25} Since
11 women continue to develop complications during long-term follow-up, the estimated
12 annual probabilities were applied at each year for the duration of the model.

13 It is not known what proportion of mesh complications, including mesh extrusion and
14 pain, resolve over time. Based on GC expert opinion, the model assumed that most
15 complications will resolve by year two and a small proportion of mesh complications
16 (10%) will persist for the duration of the model. The complication data were insufficient to
17 differentiate between different synthetic mesh types (non-absorbable and partially
18 absorbable).

19 The systematic review indicated that the risk of mesh extrusion was lower for biological
20 mesh than for synthetic mesh.⁹ The risk ratio estimated from the systematic review was
21 applied to the risk of mesh extrusion with synthetic mesh to estimate the annual risk of
22 mesh extrusion associated with the biological mesh.⁹ However, given the lack of long-
23 term clinical data on pain complications associated with the biological mesh, the same
24 rate as for synthetic mesh was used in the analysis.

25 **Cost data**

26 We adopted a UK NHS perspective and considered costs of surgical procedures, mesh
27 products, conservative management, repeat surgery, and complication management.

1 The repeat surgery cost was modelled as the average of surgical mesh and non-mesh
2 procedure costs, and also an apical procedure cost as recurrent anterior vaginal wall
3 POP could be associated with apical descent.

4 The cost associated with conservative management was obtained from a UK-based
5 RCT which included treatment with pelvic floor exercises, oestrogens and pessaries.²⁶ It
6 was assumed that only half of women experiencing recurrence would require treatment;
7 symptoms in other women were not severe enough to require treatment for their POP.²⁷

8 The economic analysis also included complementary tests (blood tests and urea and
9 electrolytes) and consultations that would typically be carried out before and after
10 surgery.

11 It was assumed that just over half of women with a mesh extrusion would require
12 surgical revision, while for the rest treatment included topical oestrogens and close
13 surveillance.²⁴ Pain management included pharmacological treatments, vaginal
14 oestrogen, dilators, psychosexual counselling, physiotherapy, or mesh removal. Costs
15 associated with persistent mesh complications were modelled to be equivalent to the
16 initial management cost. Therefore, the initial cost associated with a complication was
17 apportioned over the time horizon of the model to approximate the annual cost
18 associated with managing persistent mesh complications.

19 Unit costs were derived from national sources expressed in 2016/17 prices.²⁸⁻³¹

20 ***Utility values***

21 In order to express outcomes in the form of quality-adjusted life years (QALYs), the
22 health states of the economic model needed to be linked to appropriate utility scores.
23 Utility values were required for active POP, resolved POP, recurrent POP, and
24 complications. Utility estimates were derived from the published UK RCT that reported
25 the EuroQol (EQ-5D-3L) utility scores, estimated using the UK Time Trade-Off Tariff.²⁶

1 ***Handling uncertainty***

2 To account for the uncertainty around the input parameter point estimates, a probabilistic
3 analysis was undertaken, in which input parameters were assigned probabilistic
4 distributions.³² Subsequently, 10,000 iterations were performed, each drawing random
5 values out of the specified distributions. Mean costs, QALYs and the Net Monetary
6 Benefit (NMB) for each surgical treatment were calculated by averaging across 10,000
7 iterations. We conducted a full incremental analysis, reporting incremental cost-
8 effectiveness ratios (ICERs), interpreted as the additional expected cost per additional
9 unit gain in utility for a surgical procedure compared with the previous non-dominated
10 surgical procedure. We represented uncertainty in the optimal surgical procedure by
11 estimating the probability of each surgical procedure being cost-effective at £20,000-
12 30,000 threshold values. A range of deterministic sensitivity analyses were undertaken.
13 Table S1 (see Supplementary material) summarises all model inputs including clinical
14 data inputs, cost data and utility estimates and evidence sources; and provides details
15 on the types of distributions assigned to each.

16 **Results**

17 **Results of the systematic review and NMA**

18 A total of 2,378 studies were identified in the literature searches with 27 trials (3,194
19 participants) contributing data to the NMA outcome of same site recurrence (Figure 1).

20 Insert Figure 1.

21 Eight surgical procedures were included. One study was excluded from the NMA
22 because treatments were not connected to the rest of the network.^{33, 34} A further study
23 was excluded because the definition of recurrence was unclear.³⁴ The resulting network
24 of trials contributing data to the NMA is presented in Figure 2. (The details of the
25 included studies in the NMA and the final data file used are presented in Table S2 and
26 Table S3, respectively).

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Insert Figure 2.

Approximately 30% of the included trials were assessed as being unclear or at high risk of selection bias, namely for allocation concealment and sequence generation. Not unexpectedly, the majority of trials (96%) were unclear or at high risk of performance bias for blinding, since blinding is more difficult to incorporate in trials of surgical procedures. Approximately 40% of the included trials were unclear or at high risk of attrition bias, reporting bias, and other biases.

Each NMA model (fixed or random effects) was run until convergence was satisfactory; results were then based on a further sample of iterations on three separate chains. The random effects model had more favourable fit to the data, and so all further analyses are based on that model ($\tau=0.63$, 95% CrI 0.38 to 0.97). (See Appendix S2).

Table 1 reports the posterior median HRs and 95% CrIs for each surgical procedure relative to AC for recurrence outcome. Paravaginal repair & synthetic non-absorbable mesh had the lowest HRs (best) of recurrence when compared with AC (HR 0.25, 95% CrI 0.04-1.26). However, this procedure was tested on small numbers of women across studies and the result was characterised by considerable uncertainty, as indicated by wide 95% CrI.

Insert Table 1.

There was evidence to suggest that AC with synthetic non-absorbable mesh (HR 0.38, 95% CrI 0.24-0.59), AC with synthetic partially absorbable mesh (HR 0.27, 95% CrI 0.11-0.62), and AC with biological mesh (HR 0.44, 95% CrI 0.26-0.73) were more effective when compared with AC alone. However, there was no difference between various mesh types.

The treatment with the best posterior median rank were AC with synthetic partially absorbable mesh (1st, 95% CrI 1st to 5th) followed by paravaginal repair with synthetic non-absorbable mesh (2nd, 95% CrI 1st to 7th), AC with synthetic non-absorbable mesh (3rd, 95% CrI 1st to 6th), AC with biological mesh (4th, 95% CrI 1st to 6th), AC with synthetic

1 absorbable mesh, paravaginal repair with biological mesh (6th, 95% CrI 2nd to 8th), and
2 AC only (7th, 95% CrI 5th to 8th).

3 No evidence of inconsistency between direct and indirect estimates was identified. (See
4 Appendix S3)

5 **Results of the cost-effectiveness analysis**

6 Table 2 shows the expected total costs and QALYs for each surgical procedure. It also
7 provides the results of the incremental analysis, the mean NMB of each procedure at the
8 £20,000 per QALY threshold, the ranking of procedures by NMB, and also the probability
9 of each surgical procedure being cost effective at threshold values. Surgical procedures
10 are ordered by increasing expected total cost. All treatments were dominated by AC,
11 which was more effective in terms of increased QALYs and less expensive than all other
12 surgical procedures (Table 2). AC with synthetic non-absorbable mesh had the highest
13 expected cost and the lowest expected QALYs.

14 Insert Table 2.

15 The expected NMB at a £20,000 threshold is highest for AC (£189,156), followed by AC
16 with biological mesh (£187,869), AC with synthetic partially absorbable mesh
17 (£186,337), and lowest for AC with synthetic non-absorbable mesh (£186,306). Also, AC
18 has the highest probability of being cost-effective (Table 2). As the threshold increases,
19 the probability of AC with biological mesh increases but this probability never exceeds
20 26%.

21 ***Sensitivity analyses***

22 Results were robust to model inputs including effectiveness, costs, and utilities. Under all
23 scenarios examined AC remained the preferred surgical procedure. For example, in the
24 base-case analysis, it was assumed that treatment effectiveness at four years onwards
25 for mesh procedures will be the same as for AC. Assuming that treatment effectiveness
26 is sustained for the duration of the model did not change the conclusions.

1 Most mesh extrusion cases happened in the first year with the risk decreasing over
2 time.²⁴ This was derived from a small study and there were little data on the frequency of
3 mesh complications occurring in the long-term; however, the GC were aware of women
4 who experienced mesh complications many years after mesh insertion. Nevertheless,
5 the mesh was cost-ineffective even when we only used the available rates of mesh
6 complications.

7 The results of all deterministic sensitivity analyses are presented in Table S4 (see
8 Supplementary Information).

9 **Discussion**

10 **Main findings**

11 Overall, the results from the NMA indicate that the use of mesh is more successful than
12 non-mesh surgical procedures in preventing anterior POP recurrence. The cost-
13 effectiveness analysis attempted to bring together the information on clinical
14 effectiveness, complications, and costs, and suggested that, although mesh is more
15 effective, it causes more complications and is cost-ineffective for women who require
16 primary repair of anterior POP. It should be noted that the long term safety of mesh is
17 unclear and there is considerable uncertainty in this model input. Nevertheless, overall
18 the conclusions were robust to changes in this and other model inputs.

19 **Strengths and limitations**

20 To our knowledge this is the first urogynecologic NMA to compare multiple competing
21 treatments for POP in a cost-utility analysis. We conducted a detailed search, and took
22 considerable effort to include all available RCT data. We synthesised the effectiveness
23 data from multiple RCTs using NMA methodology, and, where possible, the long-term
24 baseline risks and the incidence rates of complications were obtained from cohort
25 studies with the longest available follow-up.

1 Despite robust methodology, not all trials provided data on key outcomes and this is a
2 limitation of the study. Although it could be argued that surgically managed recurrence is
3 a more important efficacy measure, there were insufficient data to allow synthesis of trial
4 data on this outcome using NMA methodology.

5 The length of follow-up in the RCTs informing the NMA was clustered around 12 to 36
6 months and the cost-effectiveness analysis was confined to short-term effectiveness.
7 Given the uncertainty surrounding the long-term effects associated with mesh
8 procedures, it was conservatively modelled that treatment effectiveness at four years
9 onwards for mesh procedures will be the same as for non-mesh procedure. This is in
10 keeping with the review of observational studies which suggest that the long-term
11 recurrence rates following mesh surgery and non-mesh surgery were nearly identical.⁹

12 Complication rates were poorly reported; therefore safety assessment was limited to
13 data from single studies and at best provides only proxies for serious mesh
14 complications. Despite this limitation, the conclusions were robust to changes in
15 complication rates.

16 It was recognised that POP procedures may be associated with a number of other
17 complications. For example, de novo stress urinary incontinence (SUI) has been
18 recognised as an important complication. However, the rate of SUI is similar following
19 mesh and non-mesh surgery.⁹ The risk of urge incontinence (UUI) is higher following
20 mesh surgery.⁹ However, the majority of UUI cases are successfully managed with low-
21 cost anticholinergic drugs and only a small proportion of women require treatment with
22 higher-cost botulinum toxin. Similarly, in most cases constipation is easily managed with
23 low-cost laxatives. Although, women who have obstructed defecation may require more
24 intensive management, the rate of constipation is higher following mesh surgery and the
25 exclusion of constipation only underestimated the cost-effectiveness of non-mesh
26 surgery.⁹ The management of dyspareunia is partially captured by considering pain
27 complications and since the rate of dyspareunia is higher in the mesh surgery, its
28 omission only underestimated the cost-effectiveness of non-mesh surgery.⁹

1 Another limitation of the study is that the literature search is over a year old. However, a
2 literature search on PubMed (conducted April 2019) failed to identify any relevant new
3 RCTs. Also, the GC were not aware of any relevant recently published RCTs.

4 **Interpretation**

5 Our finding that AC augmented with mesh is cost-ineffective is in line with current
6 thinking among healthcare professionals. Even though the effectiveness data favour
7 mesh, it is associated with an increased risk of complications. The cost-effectiveness
8 analysis confirmed that mesh complications have a longer-term impact on women, and
9 also on healthcare resources. It is worth pointing out that the clinical effectiveness plays
10 a lesser role in the cost-effectiveness estimate since the probability of surgically
11 managed recurrence is low and a large proportion of women are asymptomatic following
12 recurrence.

13 Our findings are consistent with a previous UK analysis which also found mesh
14 augmentation to be cost-ineffective.³⁵ The findings of a second economic evaluation
15 were inconclusive, however the results are not directly comparable because they
16 included women with AC and/or posterior colporrhaphy.²²

17 **Conclusions**

18 Overall the analysis indicated that mesh was cost-ineffective in the primary repair of
19 anterior POP, and, despite little long-term evidence on the efficacy and complications,
20 our findings were robust. As a result, the NICE guideline recommended that mesh be
21 considered only in recurrent anterior POP if apical support is adequate or an abdominal
22 approach is contraindicated, after regional multidisciplinary team review and a detailed
23 discussion with the woman about the risks of mesh insertion.

24 Given the safety concerns associated with mesh products, future research may be
25 unethical to answer this question with more certainty. However, as recommended in the
26 NICE guideline, a national data registry would provide a better picture of long-term mesh
27 complications, enable a more definite assessment of the cost-effectiveness of mesh

1 procedures, and help identify clinically important subgroups where a mesh procedure
2 may be an option. In the meantime, the data from this analysis should preclude the use
3 of mesh products in women who require primary anterior POP repair.

4

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16 FM received personal fees from NICE during the conduct of the study.

17 KW was the topic lead for Urinary Incontinence on the NICE Guideline Committee for
18 Incontinence and Pelvic Organ prolapse.

19 MC None declared.

20 RK was the topic lead for Pelvic Organ Prolapse on the NICE Guideline Committee for
21 Incontinence and Pelvic Organ prolapse.

22 **Contribution of authorship**

23 CD contributed to the NMA and conducted inconsistency checks

24 EH performed and CM assisted with the search strategy

25 ES carried out the initial NMA and the economic analysis

- 1 IM contributed to the NMA planning
- 2 SD contributed to the NMA planning and inconsistency checks
- 3 KW, RK, FM provided clinical input and interpretation of the results and their clinical
- 4 implications
- 5 MH and CM provided clinical input
- 6 PC carried out the systematic reviews and analyses
- 7 VDN oversaw the development of the systematic reviews and analyses
- 8 All authors contributed to the write up of the manuscript and approved the final version
- 9 for submission.

1 **Supporting Information**

2 Additional Supporting Information may be found in the online version of this article:

3

4 Table S1. Input parameters utilised in the economic model.

5 Table S2. Included studies in the NMA.

6 Table S3. Final data file for the NMA.

7 Table S4. Results of deterministic sensitivity analyses.

8

9 Appendix S1. Search strategy.

10 Appendix S2. NMA model fit, selection, inconsistency checks, and sensitivity analysis.

11 Appendix S3. Markov model for comparison of different surgical procedures for women
12 with anterior POP.

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1 **TABLES AND FIGURES**

2 Figure 1. Preferred Reporting Items for Systematic reviews and Meta-Analyses
3 (PRISMA) flowchart.

4 Figure 2. Network diagram of all studies included in the analysis of recurrence at the
5 same site in women undergoing primary repair of anterior POP.

6

7 Table 1. Posterior median hazard ratios and 95% credible intervals for recurrence at the
8 same site for every surgical procedure compared with each other in women with anterior
9 POP.

10 Table 2. Cost-effectiveness of surgical procedures for women with anterior POP; results
11 of probabilistic analysis. Mean values for a cohort of 100 women over 15 years.

12

13

1 **Table 1. Posterior median hazard ratios and 95% CrI for recurrence at the same site for every surgical procedure compared with each other in women with**
 2 **anterior POP.**

| | | | | | | | |
|--------------------------------------|---------------------------------------|----------------------------------------------------|--------------------------------|-------------------------------------------------------|------------------------------------|-------------------------------------------------|------------------------------------|
| Paravaginal repair & biological mesh | - | - | - | - | - | - | 0.84 (0.17, 4.22) |
| 0.72 (0.05, 9.90) | Paravaginal defect repair (abdominal) | - | - | - | - | - | - |
| 3.44 (0.66, 19.17) | 4.79 (0.32, 73.79) | Paravaginal repair & synthetic non-absorbable mesh | - | - | - | - | 0.25 (0.04, 1.37) |
| 0.95 (0.12, 7.42) | 1.31 (0.27, 6.58) | 0.28 (0.03, 2.41) | AC & synthetic absorbable mesh | - | - | - | 0.88 (0.20, 3.96) |
| 3.17 (0.56, 18.37) | 4.36 (0.45, 44.13) | 0.92 (0.14, 5.99) | 3.31 (0.67, 17.30) | AC & synthetic partially absorbable mesh ¹ | - | 0.82 (0.17, 4.01) | 0.25 (0.08, 0.72) |
| 1.91 (0.39, 9.68) | 2.66 (0.30, 24.16) | 0.56 (0.09, 3.15) | 2.01 (0.46, 8.98) | 0.61 (0.22, 1.63) | AC & biological mesh ¹ | 0.85 (0.27, 2.46) | 0.48 (0.26, 0.89) |
| 2.19 (0.46, 10.88) | 3.04 (0.35, 27.35) | 0.64 (0.11, 3.58) | 2.31 (0.55, 10.13) | 0.70 (0.28, 1.71) | 1.15 (0.63, 2.13) | AC & synthetic non-absorbable mesh ¹ | 0.36 (0.20, 0.60) |
| 0.84 (0.18, 3.82) | 1.17 (0.14, 9.80) | 0.25 (0.04, 1.26) | 0.89 (0.22, 3.52) | 0.27 (0.11, 0.62) | 0.44 (0.26, 0.73) | 0.38 (0.24, 0.59) | AC |

3
 4 ¹ indicates that the surgical procedure was included in the cost-effectiveness analysis

5 AC: anterior colporrhaphy; CrI: credible intervals; HR: Hazard ratio; NMA: network meta-analysis, POP: pelvic organ prolapse

6 Note: Lower diagonal: Posterior median HRs and 95% CrIs from NMA. HRs lower than 1 favour the column defining treatment, HRs higher than 1 favour the row defining treatment. Upper
 7 diagonal: HR and 95% CrIs from direct pairwise meta-analysis. HRs lower than 1 favour the row defining treatment, HRs higher than 1 favour the column defining treatment. Bolded cells indicate
 8 effects which do not cross the line of no treatment effect.

1 **Table 2. Cost-effectiveness of surgical procedures for adult women with anterior POP; results of probabilistic analysis. Mean values for a cohort of 100**
 2 **women over 15 years.**

| Surgical procedure | Mean QALYs ¹ | Mean total costs (£) | Incremental analysis & ICERs (£/QALY) | Mean NMB (£) | Ranking by highest NMB | Probability of being cost-effective at a £20,000-30,000/QALY threshold |
|---------------------------------------------|-------------------------|----------------------|---------------------------------------|--------------|------------------------|------------------------------------------------------------------------|
| AC only | 9.667 | £4,192 | Dominant | £189,156 | 1 | 0.695-0.676 |
| AC with biological mesh | 9.641 | £4,959 | Dominated | £187,869 | 2 | 0.177-0.211 |
| AC with synthetic partially absorbable mesh | 9.557 | £4,809 | Dominated | £186,337 | 3 | 0.098-0.091 |
| AC with synthetic non-absorbable mesh | 9.558 | £4,859 | Dominated | £186,306 | 4 | 0.030-0.022 |

3
 4 ¹ Procedures ranked from the most to the least effective according to the number of QALYs

5 AC: anterior colporrhaphy, ICER: incremental cost-effectiveness ratio, NMB: net monetary benefit, estimated using a willingness to pay £20,000/QALY, POP: pelvic organ prolapse, QALY: quality
 6 adjusted life years

7