

## Supplementary Materials 2: Non-prioritised studies eligible for inclusion in the quantitative review.

The 66 non-RCTs from outside of the UK are summarised in Table 1.<sup>1-65</sup> The most common of which included: 16 studies from the USA;<sup>3, 5, 8, 16, 21, 23, 25, 26, 36, 52, 54, 55, 57, 58, 60, 65</sup> eight studies from Denmark;<sup>9-12, 35, 41-43</sup> six studies each from Taiwan<sup>1, 2, 30, 44-46</sup> and the Netherlands;<sup>4, 28, 37-39, 66</sup> five studies from Italy;<sup>24, 29, 51, 64, 67</sup> four studies each from Canada,<sup>19, 47, 59, 68</sup> and Germany;<sup>18, 22, 40, 50</sup> three studies each from New Zealand,<sup>20, 32, 34</sup> and Sweden<sup>27, 49, 62</sup> and one from Austria,<sup>7</sup> Finland,<sup>61</sup> Greece,<sup>56</sup> Korea,<sup>13</sup> and Norway.<sup>17</sup> One study was conducted across Germany and the Netherlands.<sup>33</sup> One study was an observational study,<sup>27</sup> two were cohort studies,<sup>33, 48</sup> six studies were controlled before-and-after trials;<sup>3, 7, 13, 21, 47, 64</sup> eighteen were controlled before-and-after trials (CBA),<sup>10-12, 14, 16, 18, 22, 24, 26, 32, 44, 45, 50, 52, 58, 67</sup> and the remaining thirty nine were uncontrolled before-and-after trials (UBA). Chen, 2011 #104<sup>2, 4, 8, 17, 19, 20, 23, 25, 28-31, 34-43, 46, 49, 51, 53-57, 59-63, 65, 68, 69</sup>

The most common reasons for admission, according to the broad procedural categories, were lower-limb arthroplasty (n=31), colorectal surgery (12), cardiac surgery (n=7) and thoracic surgery (n=4). The most frequently assigned category of intervention being evaluated was ERP (n=51). Other intervention categories included: patient centred care n=2,<sup>5, 52</sup> preoperative assessment with care plan (PACP) n=2,<sup>6, 35</sup> rehabilitation n=2,<sup>48, 67</sup> staff intervention,<sup>7</sup> changing planned LOS,<sup>9</sup> specialist ward,<sup>26</sup> health educational intervention,<sup>30</sup> incentive based,<sup>32</sup> case manager,<sup>45</sup> care planning,<sup>49</sup> prehabilitation<sup>63</sup> and multi-disciplinary working working.<sup>65</sup> The most commonly measured outcome across all the time points was physical function, followed by pain, quality of life and satisfaction. Most studies collected their outcomes in hospital and within 30 days post discharge. Most studies collected just one outcome at one time point. One study collected eight outcomes over two time points.<sup>68</sup> Only two studies collected outcomes across all 4 time points,<sup>51, 57</sup> and only one study collected outcomes from both patient and carers.<sup>58</sup>

Table 2 summarises studies eligible for inclusion from the updated searches that were run in June 2022. Though two were from the UK, we decided not to prioritise these at this late stage as, being non-RCTs, they would have not been included in either the meta-analysis or QCA.

**Table 1. Non-RCTs and studies conducted outside of the UK which were not prioritised for inclusion in the in the quantitative synthesis.**

| Study<br>(First Author, Date,<br>Country, Study<br>design) | Intervention<br>Name             | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention   | Comparator Name<br>and Brief<br>Description   | Procedure                           | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female | Setting                    | Outcomes and Time points |                        |                                     |                                 |
|--|----------------------------------|-----------------------------------|---|---|-------------------------------------|---|----------------------------|--------------------------|------------------------|-------------------------------------|---------------------------------|
|  |                                  |                                   |   |   |                                     |   |                            | In<br>hospital           | PD up<br>to 30<br>days | 31<br>days<br>to 6<br>mont<br>hs PD | More<br>than 6<br>mont<br>hs PD |
| <b>Abdominal Surgery</b>                                   |                                  |                                   |   |   |                                     |   |                            |                          |                        |                                     |                                 |
| Chen 2011, <sup>1</sup> Taiwan,<br>UBA                     | Hospital Elder<br>Life Programme | ERP                               | Early mobilisation, oral<br>and nutritional<br>assistance, orienting<br>communication             | Early mobilization,<br>nutritional<br>assistance, and<br>therapeutic<br>(cognitive) activities<br>implemented by a<br>trained nurse | Abdominal surgery                   | 179, 73.0 (5.7),<br>45%                                     | Urban<br>medical<br>centre | PF, MH,<br>CF            |                        |                                     |                                 |
| Chen 2014, <sup>2</sup> Taiwan,<br>UBA                     | Hospital Elder<br>Life Programme | ERP                               | Early mobilisation, oral<br>and nutritional<br>assistance, orienting<br>communication             | Usual Care:<br>Standard hospital<br>care provided by<br>physicians and<br>nurses. Referral to<br>dietician/PT as<br>required        | Major elective<br>abdominal surgery | 189, 73.1 (5.9),<br>43%                                     | Urban<br>medical<br>centre | FT                       | FT                     |                                     |                                 |
| <b>Cardiac Surgery</b>                                     |                                  |                                   |   |   |                                     |   |                            |                          |                        |                                     |                                 |
| Burns 2019, <sup>3</sup> USA,<br>CBA                       | Minimalist<br>program            | ERP                               | Transfemoral TAVR<br>using conscious<br>sedation anaesthesia<br>(CS) and resource<br>optimisation | Usual Care: TAVR<br>under general<br>anaesthesia  | TAVR                                | 214, 80.8 (7.5),<br>38%                                     | Hospital                   |                          | QoL                    |                                     |                                 |

| Study<br>(First Author, Date,<br>Country, Study<br>design) | Intervention<br>Name        | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention   | Comparator Name<br>and Brief<br>Description  | Procedure       | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female | Setting                         | Outcomes and Time points |   |                                     |                                 |
|--|-----------------------------|-----------------------------------|---|--|-----------------|---|---------------------------------|--------------------------|---|-------------------------------------|---------------------------------|
|  |                             |                                   |   |  |                 |   |                                 | In<br>hospital           | PD up<br>to 30<br>days                    | 31<br>days<br>to 6<br>mont<br>hs PD | More<br>than 6<br>mont<br>hs PD |
| El Baz 2009, <sup>3</sup><br>Netherlands, UBA              | Clinical<br>pathway         | ERP                               | Clinical pathway from<br>admission until<br>discharge, education  | Control: no<br>structural<br>educational sessions<br>and no controlling<br>for LOS | CABG            | 198, 64.89<br>(9.95), 22%                                   | University<br>Hospital          |                          | GH,<br>MH,<br>P, PF,<br>QoL,<br>SF,<br>VT |                                     |                                 |
| Emanminia 2012, <sup>5</sup><br>USA, CT                    | Universal Bed<br>model      | Patient<br>centred care           | Care delivery system<br>that maintains patients<br>in the same room from<br>immediately post<br>operation to discharge.<br>Adapts equipment,<br>staff, and other<br>resources to a patient's<br>level of acuity | Traditional model<br>of admission  | Cardiac surgery | 610, 69.7 35%   | Suburban<br>Hospital            |                          | Sat                                       |                                     |                                 |
| Lee 2014, <sup>6</sup> Australia,<br>CT                    | Pre-operative<br>assessment | PACP                              | Medication review with<br>endocrinologist to<br>maximise glycaemic<br>control, assessment with<br>diabetic clinical nurse<br>specialist, preoperative<br>education session with<br>dietician                    | Usual care   | Cardiac surgery | 24, 63.8 (9.3),<br>29%                                      | Hospital                        |                          | Sat,<br>MH                                |                                     |                                 |
| Ospasich 2010, <sup>67</sup><br>Italy, CT                  | Physiotherapy<br>programme  | Rehab                             | Early, post-surgery, in-<br>hospital, elderly-centred<br>rehabilitation<br>programme  | Usual care   | Cardiac surgery | 224, 74.7 (3.6),<br>51%                                     | Cardiologi<br>cal rehab<br>unit | GH                       |   |                                     |                                 |

| Study<br>(First Author, Date,<br>Country, Study<br>design) | Intervention<br>Name             | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention   | Comparator Name<br>and Brief<br>Description | Procedure       | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female | Setting  | Outcomes and Time points |                        |                                     |                                 |
|--|----------------------------------|-----------------------------------|---|---|-----------------|---|----------|--------------------------|------------------------|-------------------------------------|---------------------------------|
|  |                                  |                                   |   |   |                 |   |          | In<br>hospital           | PD up<br>to 30<br>days | 31<br>days<br>to 6<br>mont<br>hs PD | More<br>than 6<br>mont<br>hs PD |
| Trummer 2006, <sup>7</sup><br>Austria, CBA                 | Patient centred<br>communication | Staff<br>intervention             | Training program for<br>developing<br>communication skills of<br>health professionals   | Control: pre<br>implementation              | Cardiac surgery | 148, 64.9 (11.4),<br>34%                                    | Hospital | GH, Sat                  |                        |                                     |                                 |
| Williams 2019, <sup>8</sup><br>USA, UBA                    | ERAS                             | ERP                               | Pre-op education,<br>prehabilitation, smoking<br>and alcohol cessation,<br>nutrition optimization,<br>pre-op fasting and carbo<br>treatment, pre-op<br>multimodal analgesia,<br>anxiolytic meds, intra-<br>op opioid and<br>multimodal analgesia<br>use, post-op sedation,<br>early extubation,<br>pulmonary function<br>optimization, post-op<br>multimodal analgesia,<br>PONV prophylaxis,<br>bowel motility,<br>glycaemic control, early<br>nutrition, early<br>ambulation, line/drain<br>removal, priority<br>discharge | Pre-ERAS                                    | Cardiac surgery | 932, 65, 31%  | Hospital | Sat                      |                        |                                     |                                 |
| <b>Colon Surgery</b>                                       |                                  |                                   |   |   |                 |   |          |                          |                        |                                     |                                 |

| Study<br>(First Author, Date,<br>Country, Study<br>design) | Intervention<br>Name                       | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention   | Comparator Name<br>and Brief<br>Description   | Procedure          | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female                                    | Setting                | Outcomes and Time points |                        |                                     |                                 |
|--|--|-----------------------------------|---|---|--------------------|--|------------------------|--------------------------|------------------------|-------------------------------------|---------------------------------|
|  |  |                                   |   |   |                    |  |                        | In<br>hospital           | PD up<br>to 30<br>days | 31<br>days<br>to 6<br>mont<br>hs PD | More<br>than 6<br>mont<br>hs PD |
| Andersen 2007, <sup>9</sup><br>Denmark, UBA                | Planned<br>hospital stay of<br>2 vs 3 days | Changing<br>planned LOS           | Planned length of stay<br>increased to 3 days   | Hospital stay 3 days  | Colonic resections | 541, 64.1, NR  | University<br>Hospital | Sat                      |                        |                                     |                                 |
| Basse 2002, <sup>10</sup><br>Denmark, CT                   | Multimodal<br>rehabilitation               | ERP                               | epidural analgesia, early<br>oral feeding,<br>mobilization and<br>laxative use                  | Conventional care   | colonic resections | 28, Median age<br>Intervention: 74<br>(Range 33-94),<br>Comparator: 64<br>(Range 52-79),<br>NR | University<br>Hospital | Fat, MF,<br>N, P         | P                      |                                     |                                 |
| Hjort Jakobsen<br>2004, <sup>11</sup> Denmark, CT          | Fast Track<br>Rehabilitation<br>Programme  | ERP                               | Information, early<br>mobilisation and<br>nutrition, catheter<br>removal, discharge<br>planning | Conventional care:<br>no defined nursing<br>care program, fluids<br>or food after,<br>physicians' orders,<br>bladder catheter > 2<br>days, epidural<br>catheter > 4 days,<br>discharge 8–10 days<br>postoperatively | Colonic resection  | 60, 72 (NR),<br>45%  | University<br>Hospital |                          | Fat,<br>PF,<br>SU      |                                     |                                 |
| Jakobsen 2006, <sup>12</sup><br>Denmark, CT                | Fast track<br>rehabilitation               | ERP                               | Information, early<br>mobilisation and<br>nutrition, catheter<br>removal, discharge<br>planning | Conventional care:<br>no well-defined<br>criteria for use of<br>nasogastric tubes,<br>mobilisation and<br>oral fluid and<br>nutrition or planned<br>hospital stay   | Colon surgery      | 160, 68.5, 51%   | University<br>Hospital |                          | Fat,<br>PF,<br>SU      |                                     |                                 |

| Study<br>(First Author, Date,<br>Country, Study<br>design) | Intervention<br>Name                   | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention   | Comparator Name<br>and Brief<br>Description  | Procedure            | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female | Setting                        | Outcomes and Time points                    |   |                                     |                                 |
|--|--|-----------------------------------|---|--|----------------------|---|--------------------------------|---|---|-------------------------------------|---------------------------------|
|  |  |                                   |   |  |                      |   |                                | In<br>hospital                              | PD up<br>to 30<br>days                            | 31<br>days<br>to 6<br>mont<br>hs PD | More<br>than 6<br>mont<br>hs PD |
| Kim 2017, <sup>13</sup> Korea,<br>CBA                      | ERAS with a<br>care protocol           | ERP                               | Information provision<br>by nurses, emotional<br>support, exercise and<br>education to encourage<br>rapid recovery and<br>promote psychological<br>stability.                       | Traditional care<br>programme  | Colonic resection    | 219, 65.4 (10.9)<br>43%                                     | University<br>Hospital         | P   |   |                                     |                                 |
| Lee 2015, <sup>14</sup> Canada,<br>CT                      | Enhanced<br>Recovery<br>Pathway        | ERP                               | Counselling, education,<br>pre-op physical<br>exercises, carbohydrate<br>loading, no pre op<br>sedation, fluid<br>management, early<br>mobilisation, catheter<br>removal, analgesia | Conventional care:<br>medical<br>optimization, no<br>formal education or<br>preoperative<br>exercise<br>instructions, no<br>bowel prep or<br>sedation protocols,<br>no structured<br>mobilisation,<br>thoracic epidural<br>analgesia or PCA.<br>Use of opioids | Colorectal resection | 190, 62.8 (13.3),<br>48%                                    | University<br>Hospital         |   | QoL,<br>GH,<br>SU                                 |                                     |                                 |
| Li 2013, <sup>68</sup> Canada,<br>UBA                      | Trimodal<br>prehabilitation<br>program | ERP                               | Exercise, nutritional<br>counselling, protein<br>supplementation and<br>anxiety reduction   | Pre-implementation<br>of prehabilitation<br>program  | Colorectal surgery   | 87, 66.9 (11.5),<br>41%                                     | University<br>health<br>centre | GH,<br>MH, P,<br>PF, PA,<br>QoL,<br>SF, VT, | GH,<br>MH,<br>P, PF,<br>PA,<br>QoL,<br>SF,<br>VT, |                                     |                                 |

| Study<br>(First Author, Date,<br>Country, Study<br>design) | Intervention<br>Name                  | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention  | Comparator Name<br>and Brief<br>Description | Procedure                            | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female  | Setting                | Outcomes and Time points |                        |                                     |                                 |
|--|---------------------------------------|-----------------------------------|--|---|--------------------------------------|--|------------------------|--------------------------|------------------------|-------------------------------------|---------------------------------|
|  |                                       |                                   |  |   |                                      |  |                        | In<br>hospital           | PD up<br>to 30<br>days | 31<br>days<br>to 6<br>mont<br>hs PD | More<br>than 6<br>mont<br>hs PD |
| Melbert 2002, <sup>16</sup><br>USA, CT                     | Critical<br>Pathway                   | ERP                               | Guidelines for staff to<br>follow when patients<br>admitted to hospital.<br>How and when to give<br>patient education, forms<br>to complete, hospital<br>systems to put in place   | No critical care<br>pathway                 | Abdominal colon or<br>rectal surgery | 385, 67 (19-99)<br>,54%  | General<br>Hospital    |                          | Sat                    |                                     |                                 |
| Mohn 2009, <sup>17</sup><br>Norway, UBA                    | Enhanced<br>Recovery After<br>Surgery | ERP                               | Information, discharge<br>planning with local<br>healthcare system,<br>normal diet and<br>nutritional supplement,<br>fluid management,<br>preoperative enema,<br>antibiotic prophylaxis,<br>no preanaesthetic<br>medication, I.V. fluid<br>management, early<br>mobilisation, fluid,<br>nutrition and pain<br>management, physical<br>activity questionnaire<br>and clinical follow up | Traditional recovery                        | Colorectal surgery                   | 247, Median<br>age<br>Intervention:<br>66(Range 19-<br>90),<br>Comparator;<br>71(Range 15-<br>90), | University<br>Hospital | Fat, N,<br>P, PA         | Fat,<br>N, P,<br>PA    |                                     |                                 |

| Study<br>(First Author, Date,<br>Country, Study<br>design)  | Intervention<br>Name                                    | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention   | Comparator Name<br>and Brief<br>Description   | Procedure                     | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female  | Setting                | Outcomes and Time points |                        |                                     |                                 |
|---|---|-----------------------------------|---|---|-------------------------------|--|------------------------|--------------------------|------------------------|-------------------------------------|---------------------------------|
|   |   |                                   |   |   |                               |  |                        | In<br>hospital           | PD up<br>to 30<br>days | 31<br>days<br>to 6<br>mont<br>hs PD | More<br>than 6<br>mont<br>hs PD |
| Raue 2004, <sup>18</sup><br>Germany, CT                     | Fast-track<br>multimodal<br>rehabilitation<br>programme | ERP                               | Epidural analgesia,<br>early oral feeding,<br>enforced mobilisation.<br>3-day pathway   | Standard-care:<br>thoracic combined<br>epidural, feeding<br>POD2, use of<br>opioids,<br>mobilisation in bed<br>POD1.  | Laparoscopic<br>sigmoidectomy | 52, Median age<br>Intervention:<br>63(range 32-<br>76),<br>Comparator:<br>65(38-86), 48%                   | University<br>Hospital | Fat, P                   |                        |                                     |                                 |
| Thanh 2016, <sup>19</sup><br>Canada, UBA                    | ERAS  | ERP                               | Perioperative recovery<br>programme   | Pre ERAS  | Colorectal surgery            | 1626, 61.2<br>(14.6), 45%  | 6 x<br>Hospitals       |                          | SU                     |                                     |                                 |
| Zargar-Shoshtari<br>2008, <sup>20</sup> New<br>Zealand, UBA | Fast-Track<br>Surgery                                   | ERP                               | Information, social<br>issues assessed,<br>preoperative ward visit,<br>carbohydrate loading,<br>admitted on morning of<br>surgery, no bowel<br>preparation, limited<br>intraoperative I.V.<br>fluids, prophylactic<br>nasogastric tubes not<br>used, early<br>mobilisation, catheter<br>removal and nutrition,<br>epidural infusion<br>stopped POD2, opioid<br>analgesic only used for<br>breakthrough pain,<br>discharge information,<br>contacted by nursing<br>staff 3/4 days post | Pre-Fast-Track:<br>conventional, non-<br>structured<br>perioperative care.<br>Discharge at<br>discretion of senior<br>team members. No<br>specified discharge<br>criteria | Colonic surgery               | 100, Median<br>age<br>Intervention:<br>65.6(Range 39-<br>93),<br>Comparator:<br>70.7(Range 40-<br>85), 37% | Surgical<br>Centre     | Fat                      | Fat                    | Fat                                 |                                 |

| Study<br>(First Author, Date,<br>Country, Study<br>design) | Intervention<br>Name | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention      | Comparator Name<br>and Brief<br>Description | Procedure | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female | Setting | Outcomes and Time points |                        |                                     |                                 |
|--|----------------------|-----------------------------------|--|---|-----------|---|---------|--------------------------|------------------------|-------------------------------------|---------------------------------|
|  |                      |                                   |  |   |           |   |         | In<br>hospital           | PD up<br>to 30<br>days | 31<br>days<br>to 6<br>mont<br>hs PD | More<br>than 6<br>mont<br>hs PD |
|  |                      |                                   | discharge. Outpatient<br>clinic follow up within<br>one week |   |           |   |         |                          |                        |                                     |                                 |
| <b>Head and neck surgery</b>                               |                      |                                   |  |   |           |   |         |                          |                        |                                     |                                 |

| Study<br>(First Author, Date,<br>Country, Study<br>design) | Intervention<br>Name | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention  | Comparator Name<br>and Brief<br>Description | Procedure   | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female | Setting                         | Outcomes and Time points |                        |                                     |                                 |
|--|----------------------|-----------------------------------|--|---|---|---|---------------------------------|--------------------------|------------------------|-------------------------------------|---------------------------------|
|  |                      |                                   |  |   |   |   |                                 | In<br>hospital           | PD up<br>to 30<br>days | 31<br>days<br>to 6<br>mont<br>hs PD | More<br>than 6<br>mont<br>hs PD |
| Jandali 2020, <sup>21</sup> USA,<br>CBA                    | ERAS                 | ERP                               | Pre-op education,<br>medical optimization,<br>speech language and<br>dietician input, pre-op<br>carbo treatment, pre-op<br>multimodal analgesia,<br>prophylactic antibiotic<br>use, intra-op opioid and<br>multimodal analgesia<br>use, goal directed fluid<br>therapy, prophylactic<br>anti-emetics,<br>normothermia<br>maintained with fluid<br>warmers and forced are<br>warming devices, post-<br>op sedation, multimodal<br>analgesia, post-op<br>antibiotic to POD3,<br>urinary catheter<br>removal POD1,<br>ambulation POD1,<br>dietician input post-op,<br>neck drain removal<br>when output <30<br>ml/day, speech and<br>language input prior to<br>oral intake, discharge<br>when afebrile and<br>adequate nutrition and<br>pain control | Pre-ERAS                                    | Major oral cavity<br>resection,<br>oropharynx<br>resection,<br>laryngectomy or<br>pharyngectomy | 185, 64.1 (11.4),<br>29%                                    | University<br>Medical<br>centre | P                        |                        |                                     |                                 |
| <b>Pelvic surgery</b>                                      |                      |                                   |  |   |   |   |                                 |                          |                        |                                     |                                 |

| Study<br>(First Author, Date,<br>Country, Study<br>design) | Intervention<br>Name   | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention  | Comparator Name<br>and Brief<br>Description   | Procedure                  | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female                    | Setting                        | Outcomes and Time points |                        |                                     |                                 |
|--|--|-----------------------------------|--|---|----------------------------|--|--------------------------------|--------------------------|------------------------|-------------------------------------|---------------------------------|
|  |  |                                   |  |   |                            |  |                                | In<br>hospital           | PD up<br>to 30<br>days | 31<br>days<br>to 6<br>mont<br>hs PD | More<br>than 6<br>mont<br>hs PD |
| Brodner 2001, <sup>22</sup><br>Germany, CT                 | Multimodal<br>perioperative<br>management                    | ERP                               | Only post-op care<br>differs between two<br>groups: thoracic<br>epidural analgesia, early<br>mobilisation, oral<br>nutrition   | Comparator 1 and 2:<br>Routine<br>postoperative care,<br>IV nutrition and<br>mobilisation from<br>POD1                | Radical cystectomy         | 45, 62 (9.0),<br>Comparator 1:<br>59 (13.5),<br>Comparator 2:<br>63 (8.8), 13% | University<br>Hospital         | P, Fat                   |                        |                                     |                                 |
| Turini 2017, <sup>23</sup> USA,<br>UBA                     | Robotic assisted<br>laparoscopic<br>radical<br>prostatectomy | ERP                               | Pre-op education,<br>intraoperative opium<br>suppository, pelvic floor<br>rehabilitation, social<br>work support, early<br>feeding, early<br>mobilisation, post-op IV<br>non-narcotic pain<br>control, facilitated<br>discharge, patient and<br>family education, post<br>discharge phone call | Pre-implementation  | Radical<br>prostatectomy   | 105, 61.0, NA  | University<br>Hospital         |                          |                        | QoL,<br>Sat                         | QoL,<br>Sat                     |
| <b>Lower Limb Arthroplasty</b>                             |  |                                   |  |   |                            |  |                                |                          |                        |                                     |                                 |
| Arienti 2020, <sup>24</sup> Italy,<br>CT                   | Fast-track<br>rehabilitation<br>protocol                     | ERP                               | Fast track surgery (sub-<br>vastus approach with<br>patella-in-balance),<br>patient focused care,<br>early mobilisation,<br>standardised<br>postoperative<br>milestones  | Conventional<br>rehabilitation<br>protocol – standard<br>TKA followed by<br>conventional<br>rehabilitation<br>program | Total knee<br>arthroplasty | 43, 69, 77%  | Rehabilita<br>tion<br>Hospital | PF, P                    |                        |                                     |                                 |
| Auyong 2015, <sup>25</sup><br>USA, UBA                     | ERAS   | ERP                               | Perioperative recovery<br>programme: education,<br>identified care<br>companion, short acting  | Standardized<br>ERAS pathway<br>including femoral<br>nerve block:   | Total knee<br>arthroplasty | 252, 67.2 (10.0),<br>66%   | Hospital/<br>medical<br>centre | P                        | SU                     |                                     |                                 |

| Study<br>(First Author, Date,<br>Country, Study<br>design) | Intervention<br>Name                | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention   | Comparator Name<br>and Brief<br>Description  | Procedure               | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female | Setting             | Outcomes and Time points |                        |                                     |                                 |
|--|-------------------------------------|-----------------------------------|---|--|-------------------------|---|---------------------|--------------------------|------------------------|-------------------------------------|---------------------------------|
|  |                                     |                                   |   |  |                         |   |                     | In<br>hospital           | PD up<br>to 30<br>days | 31<br>days<br>to 6<br>mont<br>hs PD | More<br>than 6<br>mont<br>hs PD |
|  |                                     |                                   | spinal or general anaesthesia, standardised I.V. fluids, 48h adductor canal block, early mobilisation, standardised analgesics    | optional education, no specific care companion, no anti-emetics, long-acting spinal or general anaesthetic, no standardized steroids, no standardized I.V. fluids, Intermittent femoral nerve block, no standardisation of analgesics, mobilisation POD1 |                         |   |                     |                          |                        |                                     |                                 |
| Batsis 2008, <sup>26</sup> USA, CT                         | Specialty Orthopaedic Surgery Units | Specialist Ward                   | General care nursing unit where patients receive all their postoperative care. Multidisciplinary staff with orthopaedic expertise | Admitted to non-orthopaedic nursing units  | Total knee arthroplasty | 5534, 68.3 (10.8), 57%                                      | Hospital            |                          | SU                     |                                     |                                 |
| Berg 2020, <sup>27</sup> Sweden, Observational             | Fast track care program             | ERP                               | Admission on the day of surgery; mobilization within 3–6 hours after operation; and functional discharge criteria in practice     | Non-fast track (or unknown)  | Joint replacement       | 59562, 68.3 (9.9), 57%                                      | Hospitals           |                          |                        |                                     | P, Sat, QoL                     |
| Brunenberg 2005, <sup>28</sup> Netherlands, UBA            | Joint recovery program              | ERP                               | Pre-assessment screening approximately 6 weeks before operation   | Usual care   | Joint replacement       | 160, 64.4 (11.8), 70%                                       | University Hospital |                          |                        | PF, QoL                             | PF QoL                          |

| Study<br>(First Author, Date,<br>Country, Study<br>design) | Intervention<br>Name   | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention   | Comparator Name<br>and Brief<br>Description  | Procedure               | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female | Setting                              | Outcomes and Time points |                        |                                     |                                 |
|--|------------------------|-----------------------------------|---|--|-------------------------|---|--------------------------------------|--------------------------|------------------------|-------------------------------------|---------------------------------|
|  |                        |                                   |   |  |                         |   |                                      | In<br>hospital           | PD up<br>to 30<br>days | 31<br>days<br>to 6<br>mont<br>hs PD | More<br>than 6<br>mont<br>hs PD |
|  |                        |                                   | including anamnesis and blood samples, physical examination, and x-rays. Also, home situation and post discharge care needs were analysed. Patient education took place 1 to 2 weeks preoperatively. Group based rehabilitation after operation and supervision by nurses and physiotherapists for duration of admission                              |  |                         |   |                                      |                          |                        |                                     |                                 |
| Castorina 2017, <sup>29</sup><br>Italy, UBA                | Fast track<br>protocol | ERP                               | Surgery – medial incision, tourniquet only during cementation, no pre-surgery medication, use of IV tranexamic acid, accurate intraoperative homeostasis, no articular drainage, use of colloid patch, 5 hours 90° post-surgery, continuous elastomeric pump infusion of bethamethasone, ondansetron, ketorolac, and morphine. Rehabilitation – usual | Traditional surgical method – one regular articular drainage and tranexamic acid intravenous injection used at the beginning of surgery and during cementation. Standard rehabilitation – 2 sessions/day for 30 mins for first 3 days post-surgery | Total knee arthroplasty | 132, 72.0 (7.4), NR   | Traumatology and rehabilitation unit | PF, P                    | PF, P                  | PF, P                               |                                 |

| Study<br>(First Author, Date,<br>Country, Study<br>design) | Intervention<br>Name                  | Broad<br>Intervention<br>Category     | Brief description or<br>key features of<br>intervention  | Comparator Name<br>and Brief<br>Description | Procedure                   | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female | Setting              | Outcomes and Time points |                        |                                     |                                 |
|--|---------------------------------------|---------------------------------------|--|---|-----------------------------|---|----------------------|--------------------------|------------------------|-------------------------------------|---------------------------------|
|  |                                       |                                       |  |   |                             |   |                      | In<br>hospital           | PD up<br>to 30<br>days | 31<br>days<br>to 6<br>mont<br>hs PD | More<br>than 6<br>mont<br>hs PD |
|  |                                       |                                       | rehabilitation program<br>for first 3 days post-op<br>plus 3 weeks of 1<br>session/day for 1 hour,<br>followed by 20 mins<br>cryotherapy   |   |                             |   |                      |                          |                        |                                     |                                 |
| Chen, 2014, <sup>30</sup><br>Taiwan, UBA                   | Health<br>educational<br>intervention | Health<br>educational<br>intervention | Cognitive behavioural<br>health intervention and<br>education pamphlet and<br>CD   | Routine care                                | Total knee<br>replacement   | 92, 69.3 (9.0),<br>69%                                      | Teaching<br>hospital | P, PF                    |                        |                                     |                                 |
| Christelis 2015, <sup>31</sup><br>Australia, UBA           | ERAS                                  | ERP                                   | Counselling,<br>preadmission review,<br>minimal fasting,<br>carbohydrate loading,<br>no premedication, pre-<br>emptive analgesia,<br>spinal anaesthesia,<br>minimal intravenous<br>morphine<br>intraoperatively, I.V.<br>fluid restriction,<br>antiemetic's,<br>multimodal oral<br>analgesia, carbohydrate<br>supplementation, early<br>mobilisation | Existing practice                           | Hip or knee<br>arthroplasty | 709, 67.6 (10.6),<br>61%                                    | 3 x<br>hospitals     | P                        |                        | P, PF,<br>Sat                       |                                 |
| Cullen 2012, <sup>32</sup> New<br>Zealand, CT              | Incentive based                       | Incentive<br>based                    | Surgery at a new site<br>with a clinically-led<br>care plan, with staff<br>who are incentive<br>based. The participating<br>surgeons and   | NR  | Hip and knee<br>replacement | 335, 65.2 (range<br>25-92), 53%                             | Hospital             |                          | SU                     |                                     |                                 |

| Study<br>(First Author, Date,<br>Country, Study<br>design)         | Intervention<br>Name                   | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention   | Comparator Name<br>and Brief<br>Description | Procedure               | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female | Setting       | Outcomes and Time points |                        |                                     |                                 |
|--|--|-----------------------------------|---|---|-------------------------|---|---------------|--------------------------|------------------------|-------------------------------------|---------------------------------|
|  |  |                                   |   |   |                         |   |               | In<br>hospital           | PD up<br>to 30<br>days | 31<br>days<br>to 6<br>mont<br>hs PD | More<br>than 6<br>mont<br>hs PD |
|  |  |                                   | anaesthetists were responsible for increasing surgical throughput. No junior staff.   |   |                         |   |               |                          |                        |                                     |                                 |
| Fussenich, 2020, <sup>33</sup><br>Germany &<br>Netherlands, Cohort | Fast-track<br>surgery<br>(Netherlands) | ERP                               | Preclinical phase - preoperative screening, clinical admission on the day of surgery – preoperative preparations started, Instructions by ergotherapist, discharge POD4 with physiotherapy and pain relief  | Conventional care (Germany)                 | Total hip arthroplasty  | 360, 67.7 (9.0), 59%  | 3 x hospitals |                          |                        |                                     | P, PF, QoL, Sat                 |
| Gwynne-Jones 2017, <sup>34</sup> New Zealand, UBA                  | Enhanced Recovery After Surgery        | ERP                               | Early identification/treatment of preoperative anaemia, preoperative health questionnaires to patients/GPs, weekly preoperative education class, written information, streamlined preadmission process, day of surgery admission, standardized anaesthetic and analgesia guidelines, intraoperative local | Historical cohort pre-ERAS pathway          | Hip or knee replacement | 632, 67.6 (11.8), NK  | Hospital      |                          |                        | PF                                  |                                 |

| Study<br>(First Author, Date,<br>Country, Study<br>design) | Intervention<br>Name  | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention   | Comparator Name<br>and Brief<br>Description  | Procedure                    | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female | Setting                     | Outcomes and Time points |                        |                                     |                                 |
|--|---|-----------------------------------|---|--|------------------------------|---|-----------------------------|--------------------------|------------------------|-------------------------------------|---------------------------------|
|  |   |                                   |   |  |                              |   |                             | In<br>hospital           | PD up<br>to 30<br>days | 31<br>days<br>to 6<br>mont<br>hs PD | More<br>than 6<br>mont<br>hs PD |
|  |   |                                   | anaesthetic infiltration,<br>perioperative blood<br>management algorithm,<br>day of surgery<br>mobilisation, nurse and<br>physiotherapy led<br>discharge criteria   |  |                              |   |                             |                          |                        |                                     |                                 |
| Hansen 2012, <sup>35</sup><br>Denmark, UBA                 | Preoperative<br>screening (as<br>part of fast-<br>track<br>programme) | PACP                              | Preoperative screening<br>(which took place as<br>part of 'motivational<br>conversation' with a<br>nurse) identified any<br>risk factors, which were<br>addressed by an<br>appropriate intervention<br>ranging from providing<br>information to referral<br>to dietician  | Control group: no<br>formal preoperative<br>screening, no<br>intervention during<br>period between<br>decision to operate<br>and surgery | Hip and knee<br>arthroplasty | 132, 68.4 (10.2),<br>49%                                    | Hospital                    |                          |                        | PF,<br>QoL                          |                                 |
| Healy 2002, <sup>36</sup> USA,<br>UBA                      | Clinical<br>pathway and<br>knee<br>standardisation<br>program         | ERP                               | Multidisciplinary team-<br>based approach.<br>Pathway begins when<br>decision made to<br>operate, continues<br>throughout acute-care<br>and includes<br>rehabilitation and<br>physical therapy.<br>Standardisation<br>program aims to reduce<br>variation in implant<br>selection and cost for<br>hospital and uses a | No clinical pathway<br>or knee-implant<br>standardisation<br>program   | Total knee<br>arthroplasty   | 159, 69.9 (range<br>45-91), NK                              | Clinic<br>medical<br>centre |                          |                        |                                     | P,PF<br>Sat                     |

| Study<br>(First Author, Date,<br>Country, Study<br>design) | Intervention<br>Name       | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention   | Comparator Name<br>and Brief<br>Description | Procedure                          | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female | Setting  | Outcomes and Time points |                        |                                     |                                 |
|--|----------------------------|-----------------------------------|---|---|------------------------------------|---|----------|--------------------------|------------------------|-------------------------------------|---------------------------------|
|  |                            |                                   |   |   |                                    |   |          | In<br>hospital           | PD up<br>to 30<br>days | 31<br>days<br>to 6<br>mont<br>hs PD | More<br>than 6<br>mont<br>hs PD |
|  |                            |                                   | patient-type scoring system to evaluate expected demand that patients will place on their knee implants after surgery.  |   |                                    |   |          |                          |                        |                                     |                                 |
| Hoorntje 2017, <sup>37</sup><br>Netherlands, UBA           | Outpatient surgery pathway | ERP                               | Individual education, presence of personal coach (relative), morning surgery, IV antibiotics up to 8h postoperatively, opioid sparing multimodal pain control, compression bandage removed 24h postoperatively, physiotherapy 2,4,6h postoperatively and at home on day 1, phone call 2 and 7 days from nurse | Standard fast track surgery                 | Unicompartmental knee arthroplasty | 36, 63 (6.5), 53%   | Hospital | QoL, MH, PF              | QoL, MH, PF            | QoL, MH, PF                         |                                 |
| Jansen 2020, <sup>38</sup><br>Netherlands, UBA             | Fast track pathway         | ERP                               | Opiate-sparing multimodal pain protocol of: paracetamol; non-steroidal anti-inflammatory; 'escape' opiate, only if necessary; local infiltration analgesia; dexamethasone; anti-emetics; and low-dose   | Non-fast-track pathway                      | Total knee arthroplasty            | 686, 67.8 (9.0), 29.3%                                      | Hospital |                          |                        |                                     | PF, QoL, P                      |

| Study<br>(First Author, Date,<br>Country, Study<br>design) | Intervention<br>Name             | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention  | Comparator Name<br>and Brief<br>Description  | Procedure                             | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female | Setting  | Outcomes and Time points |                        |                                      |                                  |
|--|----------------------------------|-----------------------------------|--|--|---------------------------------------|---|----------|--------------------------|------------------------|--------------------------------------|----------------------------------|
|  |                                  |                                   |  |  |                                       |   |          | In<br>hospital           | PD up<br>to 30<br>days | 31<br>days<br>to 6<br>month<br>hs PD | More<br>than 6<br>month<br>hs PD |
|  |                                  |                                   | spinal anesthesia enabling patients to mobilize out of bed on the day of surgery within four hours after the operation. No wound drains, urinary catheters or patient-controlled analgesia pumps were used during admission, and all patients had standard wound dressings and knee pressure bandages applied postoperatively. Pre-operative information folder and a pre-operative scheduled meeting with an orthopaedic clinic nurse to discuss all important rehabilitation and discharge details with the patient and their family beforehand. |  |                                       |   |          |                          |                        |                                      |                                  |
| Kort 2017, <sup>39</sup><br>Netherlands,<br>UBA            | Outpatient<br>surgery<br>pathway | ERP                               | Admitted day of surgery, perioperative use of dexamethasone, and tranexamic acid, prophylactic use of IV and oral antibiotics, first mobilisation <4h  | Conventional<br>enhanced recovery<br>pathway | Unicompartmental<br>knee arthroplasty | 40, 60.9 (5.4),<br>60%                                      | Hospital | P                        |                        | PF,<br>QoL                           |                                  |

| Study<br>(First Author, Date,<br>Country, Study<br>design) | Intervention<br>Name                                       | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention   | Comparator Name<br>and Brief<br>Description   | Procedure                  | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female | Setting                | Outcomes and Time points |                        |                                     |                                 |
|--|--|-----------------------------------|---|---|----------------------------|---|------------------------|--------------------------|------------------------|-------------------------------------|---------------------------------|
|  |  |                                   |   |   |                            |   |                        | In<br>hospital           | PD up<br>to 30<br>days | 31<br>days<br>to 6<br>mont<br>hs PD | More<br>than 6<br>mont<br>hs PD |
|  |  |                                   | postoperatively,<br>compression bandage<br>use for 8h<br>postoperatively, use of<br>elastic bandage 4 days<br>postoperatively   |   |                            |   |                        |                          |                        |                                     |                                 |
| Krummenauer<br>2011, <sup>40</sup> Germany,<br>UBA         | Interdisciplinar<br>y Clinical<br>Pathway                  | ERP                               | Patients invited to<br>information session<br>with surgeon 1 month<br>before surgery. Pre-<br>surgery education with<br>physiotherapist about<br>post-operative care.<br>Hospitalisation day of<br>surgery unless patient<br>lives far away in which<br>case hospitalisation day<br>before surgery. Same<br>team used throughout<br>day for all aspects of<br>operation. Post-surgical<br>rehabilitation in patient<br>room | Pre-pathway   | Total knee<br>arthroplasty | 260, 68.7 (range<br>43-88), 59%                             | University<br>Hospital |                          |                        | PF                                  |                                 |
| Larsen 2008, <sup>41</sup><br>Denmark, UBA                 | Accelerated<br>perioperative<br>care and<br>rehabilitation | ERP                               | Perioperative recovery<br>programme: education,<br>hospitalization day of<br>surgery, case<br>management, ward<br>integration, early<br>mobilisation, nutrition,<br>fluid management  | Standard care: no<br>information day,<br>hospitalised day<br>before surgery,<br>different nurses in<br>charge, rehab by<br>physiotherapists,<br>mobilisation on<br>POD1 | Hip Arthroplasty           | 105, 66 (9.7),<br>48%                                       | Regional<br>hospital   |                          |                        | QoL                                 |                                 |

| Study<br>(First Author, Date,<br>Country, Study<br>design) | Intervention<br>Name                       | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention  | Comparator Name<br>and Brief<br>Description         | Procedure                  | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female | Setting             | Outcomes and Time points |                        |                                     |                                 |
|--|--|-----------------------------------|--|---|----------------------------|---|---------------------|--------------------------|------------------------|-------------------------------------|---------------------------------|
|  |  |                                   |  |   |                            |   |                     | In<br>hospital           | PD up<br>to 30<br>days | 31<br>days<br>to 6<br>mont<br>hs PD | More<br>than 6<br>mont<br>hs PD |
| Larsen 2010, <sup>42</sup><br>Denmark, UBA                 | Fast track<br>intervention                 | ERP                               | Preoperative<br>optimization regimen,<br>surgery at the beginning<br>of the week, posterior<br>incision, intraoperative<br>local infiltration<br>analgesia, no drains,<br>standardised blood<br>transfusion,<br>preoperative and<br>postoperative antibiotic<br>use, postoperative care<br>in nurse-led fast-track<br>care unit, patients wore<br>own clothes, daily<br>goals, early<br>mobilisation, daily<br>therapy with<br>physiotherapy and<br>occupational therapist | Results compared to<br>normative<br>population data | Hip Arthroplasty           | 196, 70 (8.3),<br>45%                                       | Hospital            |                          |                        | QoL,<br>PF                          | QoL,<br>PF                      |
| Larsen 2012, <sup>43</sup><br>Denmark, UBA                 | Fast track<br>intervention                 | ERP                               | Preoperative<br>optimization regimen,<br>postoperative care in<br>nurse-led fast-track care<br>unit, early mobilisation,<br>multimodal pain relief,<br>daily physiotherapy,<br>exercise plan on<br>discharge   | Results compared to<br>normative<br>population data | Knee arthroplasty          | 211, 67 (10.3),<br>51%                                      | Hospital            |                          |                        | QoL,<br>PF                          | QoL,<br>PF                      |
| Liang 2021, <sup>44</sup><br>Taiwan, CT                    | Modified<br>Hospital Elder<br>Life Program | ERP                               | Four protocols:<br>orientation<br>communication, early   | Usual care  | Total knee<br>arthroplasty | 140, 71.2 (5.2),<br>78.6%                                   | General<br>Hospital |                          | MH,<br>PF              | MH,<br>PF                           | MH,<br>PF                       |

| Study<br>(First Author, Date,<br>Country, Study<br>design) | Intervention<br>Name                 | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention   | Comparator Name<br>and Brief<br>Description                             | Procedure               | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female | Setting             | Outcomes and Time points |                        |                                     |                                 |
|--|--------------------------------------|-----------------------------------|---|---|-------------------------|---|---------------------|--------------------------|------------------------|-------------------------------------|---------------------------------|
|  |                                      |                                   |   |   |                         |   |                     | In<br>hospital           | PD up<br>to 30<br>days | 31<br>days<br>to 6<br>mont<br>hs PD | More<br>than 6<br>mont<br>hs PD |
|  | (mHELP)                              |                                   | mobilization, providing vision and hearing impairment equipment, and early intervention for volume depletion to prevent dehydration   |   |                         |   |                     |                          |                        |                                     |                                 |
| Lin 2002, <sup>46</sup> Taiwan, UBA                        | Clinical pathway                     | ERP                               | Perioperative clinical pathway including nursing assessment, pain management, nutrition, activity, education, and discharge planning  | Pre-clinical pathway  | Total knee arthroplasty | 114, 68.9 (6.2), NK   | University Hospital |                          |                        |                                     | PF                              |
| Lin 2011, <sup>70</sup> Taiwan, CT                         | Care Mapping                         | Case Manager                      | Continuous patient care including during enrolment, hospitalisation period and follow up service post-discharge. Cared for by primary nurse using a case map. Responsibilities of case managers included: education, coordination, service monitoring and follow up | Control group: cared for using a clinical pathway with no case managers | Total knee replacement  | 83, 72.73 (8.42), 63%                                       | University Hospital | PF                       | PF, Sat                |                                     |                                 |
| Marsh 2019, <sup>47</sup> Canada,CBA                       | Early discharge patient care pathway | ERP                               | Patient and caregiver education around anaesthesia and enhanced discharge program and projected care pathway, spinal  | Standard care   | Total knee arthroplasty | 50, 64.5 (4.3), 48%   | Hospital            |                          |                        |                                     | PF, MH, QoL                     |

| Study<br>(First Author, Date,<br>Country, Study<br>design)                           | Intervention<br>Name                   | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention  | Comparator Name<br>and Brief<br>Description      | Procedure                           | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female | Setting   | Outcomes and Time points |                        |                                     |                                 |
|--|--|-----------------------------------|--|--|-------------------------------------|---|---|--------------------------|------------------------|-------------------------------------|---------------------------------|
|  |  |                                   |  |  |                                     |   |   | In<br>hospital           | PD up<br>to 30<br>days | 31<br>days<br>to 6<br>mont<br>hs PD | More<br>than 6<br>mont<br>hs PD |
|  |  |                                   | anaesthesia, and<br>periarticular multi-<br>modal injection, nerve<br>block, home with intra-<br>articular catheter and<br>continuous ropivacaine<br>infusion pain-pump,<br>catheter removed 72<br>hours postoperatively |  |                                     |   |   |                          |                        |                                     |                                 |
| Naylor 2018, <sup>48</sup><br>Australia, propensity<br>score matched cohort<br>study | Inpatient<br>rehabilitation<br>pathway | Rehabilitatio<br>n                | Inpatient rehabilitation   | No inpatient<br>rehabilitation<br>pathway        | Total hip<br>arthroplasty           | 246, 67 (10),<br>66%  | 12 private<br>hospitals                                     |                          |                        | QoL,<br>PF                          | QoL,<br>PF                      |
| Olsson 2016, <sup>49</sup><br>Sweden, UBA  | Person-centred<br>care                 | Care<br>planning                  | Develop patient-<br>clinician 'partnership'<br>to produce<br>individualised care plan  | Conventional care:<br>assessment,<br>information | Total hip<br>arthroplasty           | 266, 67 (13),<br>66%  | 1 x<br>County<br>hospital, 1<br>x<br>university<br>hospital | PF                       |                        |                                     |                                 |
| Renkawitz 2010, <sup>50</sup><br>Germany, CT   | Accelerated<br>Clinical<br>Pathway     | ERP                               | Patient-controlled<br>regional analgesia<br>pumps, ultra-<br>early/doubled<br>physiotherapy and<br>motor-driven<br>continuous passive<br>motion machine units  | Standard<br>accelerated clinical<br>pathway      | Total knee<br>replacement           | 143, 68.0 (10.1),<br>74%                                    | University<br>medical<br>centre                             | P, PF                    |                        |                                     |                                 |
| Romano 2021, <sup>51</sup><br>Italy, UBA   | Fast-track<br>protocol                 | ERP                               | Patient education and<br>counselling, assessment<br>and optimisation,<br>minimal preoperative  | Standard care                                    | Joint replacement<br>(hip and knee) | 181, 71 (range<br>64-77), 48%                               | Hospital  | P                        | P                      | P                                   | P                               |

| Study<br>(First Author, Date,<br>Country, Study<br>design) | Intervention<br>Name                        | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention   | Comparator Name<br>and Brief<br>Description | Procedure         | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female | Setting                 | Outcomes and Time points |                        |                                     |                                 |
|--|---|-----------------------------------|---|---|-------------------|---|-------------------------|--------------------------|------------------------|-------------------------------------|---------------------------------|
|  |   |                                   |   |   |                   |   |                         | In<br>hospital           | PD up<br>to 30<br>days | 31<br>days<br>to 6<br>mont<br>hs PD | More<br>than 6<br>mont<br>hs PD |
|  |   |                                   | fasting, pre-emptive oral analgesia, standard anaesthetic protocol and multimodal analgesia, minimally invasive surgery, intraoperative and interarticular tranexamic acid, reduced tourniquet use, accurate haemostasis, no drains or catheters, restricted fluid balance, active patient warming blanket, postoperative multimodal analgesia and nausea and vomiting prophylaxis, cryocompression, negative wound therapy management, early oral intake, early mobilisation |   |                   |   |                         |                          |                        |                                     |                                 |
| Stone 2008, <sup>52</sup> USA, CT                          | The Planetree patient-centred model of care | Patient centred care              | Provides framework and implementation guidance on 10 areas: human interaction, architecture and interior design, food and nutrition, patient and family education, family involvement, spirituality, human  | Standard care                               | Joint replacement | 869, 66 (range 33-88) 57%                                   | 2 x Community hospitals | Sat                      |                        |                                     |                                 |

| Study<br>(First Author, Date,<br>Country, Study<br>design) | Intervention<br>Name                   | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention   | Comparator Name<br>and Brief<br>Description | Procedure                 | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female | Setting             | Outcomes and Time points |                        |                                     |                                 |
|--|--|-----------------------------------|---|---|---------------------------|---|---------------------|--------------------------|------------------------|-------------------------------------|---------------------------------|
|  |  |                                   |   |   |                           |   |                     | In<br>hospital           | PD up<br>to 30<br>days | 31<br>days<br>to 6<br>mont<br>hs PD | More<br>than 6<br>mont<br>hs PD |
|  |  |                                   | touch, healing arts,<br>complementary/alternati<br>ve therapy, healthy<br>communities   |   |                           |   |                     |                          |                        |                                     |                                 |
| Tan 2018, <sup>53</sup><br>Australia, UBA                  | ERAS                                   | ERP                               | Multidisciplinary<br>preoperative patient<br>information, reduction<br>in preoperative and<br>postoperative fasting,<br>increase in spinal<br>anaesthesia,<br>intraoperative<br>antiemetic prophylaxis,<br>tranexamic acid,<br>intraoperative warming,<br>oral multimodal<br>analgesia, cessation of<br>IV fluids POD1, early<br>mobilisation, predefined<br>discharge criteria | Pre-implementation                          | Hip replacement           | 230, 64.3 (10.4),<br>67%                                    | Private<br>hospital | PF, P                    |                        | PF, P                               |                                 |
| Ziegler 2019, <sup>54</sup> USA,<br>UBA                    | Same day<br>discharge<br>program (SDD) | ERP                               | Early surgery, short-<br>acting spinal and<br>multimodal pain<br>management regimen,<br>early mobilisation,<br>predefine discharge<br>criteria involving<br>independent and safe<br>ambulation and<br>activities of daily living,<br>involvement of coach<br>(relative)   | Standard care                               | Total hip<br>arthroplasty | 132, 65.3 (9.6),<br>62%                                     | Hospital            |                          | P, PF,<br>QoL,<br>Sat  |                                     |                                 |

| Study<br>(First Author, Date,<br>Country, Study<br>design) | Intervention<br>Name | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention   | Comparator Name<br>and Brief<br>Description | Procedure                                 | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female | Setting  | Outcomes and Time points |                        |                                     |                                 |
|--|----------------------|-----------------------------------|---|---|---|---|----------|--------------------------|------------------------|-------------------------------------|---------------------------------|
|  |                      |                                   |   |   |   |   |          | In<br>hospital           | PD up<br>to 30<br>days | 31<br>days<br>to 6<br>mont<br>hs PD | More<br>than 6<br>mont<br>hs PD |
| <b>Spinal Surgery</b>                                      |                      |                                   |   |   |   |   |          |                          |                        |                                     |                                 |
| Ifrach 2020, <sup>55</sup> USA,<br>UBA                     | ERAS                 | ERP                               | Patient education and<br>optimisation, early<br>discharge planning,<br>metabolism<br>management,<br>multimodal analgesia,<br>surgery checklist, early<br>mobilisation, wound<br>care management   | Pre- ERAS                                   | Spinal and<br>peripheral nerve<br>surgery | 564, 73.2 (5.6),<br>48%                                     | Hospital | P, PF,<br>SU             |                        |                                     |                                 |
| <b>Thoracic surgery</b>                                    |                      |                                   |   |   |   |   |          |                          |                        |                                     |                                 |
| Khoury 2021, <sup>56</sup><br>Greece, UBA                  | ERAS                 | ERP                               | Preoperative nutritional<br>screening and<br>carbohydrate loading,<br>smoking cessation<br>education, preoperative<br>medication, clear fluids<br>up to 2 hours before<br>surgery, multimodal<br>intraoperative analgesia,<br>thoracic epidural,<br>minimally invasive<br>surgery, fluid<br>management, antibiotics<br>prophylaxis, mechanical<br>ventilation<br>management, antiemetic<br>medication,<br>postoperative<br>multimodal analgesia,<br>early mobilisation, early | Pre-ERAS                                    | Pulmonary<br>resections                   | 234, 62.5 (range<br>54-70), 63%                             | Hospital | P, Sat                   |                        |                                     |                                 |

| Study<br>(First Author, Date,<br>Country, Study<br>design) | Intervention<br>Name                              | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention   | Comparator Name<br>and Brief<br>Description | Procedure           | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female                    | Setting  | Outcomes and Time points |  |                                     |                                 |
|--|---|-----------------------------------|---|---|---------------------|--|----------|--------------------------|--|-------------------------------------|---------------------------------|
|  |   |                                   |   |   |                     |  |          | In<br>hospital           | PD up<br>to 30<br>days                                     | 31<br>days<br>to 6<br>mont<br>hs PD | More<br>than 6<br>mont<br>hs PD |
|  |   |                                   | tube, and catheter<br>removal   |   |                     |  |          |                          |  |                                     |                                 |
| Nelson 2019, <sup>57</sup> USA,<br>UBA                     | ERAS  | ERP                               | Preoperative education,<br>preanesthetic analgesia,<br>perioperative steroids,<br>IV anaesthesia,<br>intraoperative<br>multimodal analgesia,<br>goal directed fluid<br>replacement, long-<br>acting nerve block,<br>postoperative<br>multimodal analgesia,<br>early oral intake | Pre-ERAS and<br>transition                  | Pulmonary resection | 471, 66 (range<br>58-75), 48%  | Hospital | PF                       | PF   | PF                                  | PF                              |
| Sun 2017, <sup>58</sup> USA,<br>CT                         | Multimedia<br>self-<br>management<br>intervention | ERP                               | 4 sessions of<br>multimodal multimedia<br>model of care<br>specifically for lung<br>cancer patients. Covers<br>symptom management,<br>self-care, and<br>postoperative recovery<br>management. Includes<br>videos, written<br>handbook, and<br>telephone support once<br>home    | Usual care                                  | Lung surgery        | Patient 38, 65.6<br>(12.8), 47%;<br>Family<br>caregivers 22,<br>60 (14.5), 82% |          |                          | PF,<br>QoL<br>(patie<br>nt and<br>family<br>caregi<br>ver) |                                     |                                 |
| Tahiri 2020, <sup>59</sup><br>Canada, UBA                  | ERAS  | ERP                               | Intercostal block with<br>patient-controlled<br>analgesia, early removal<br>of arterial line, early<br>feeding, incentive   | Control group                               | Lung surgery        | 196, 65.7 (9.4),<br>67%  |          |                          | QoL  | QoL                                 |                                 |

| Study<br>(First Author, Date,<br>Country, Study<br>design) | Intervention<br>Name             | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention  | Comparator Name<br>and Brief<br>Description | Procedure                                 | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female | Setting                | Outcomes and Time points |                        |                                      |                                  |
|--|----------------------------------|-----------------------------------|--|---|---|---|------------------------|--------------------------|------------------------|--------------------------------------|----------------------------------|
|  |                                  |                                   |  |   |   |   |                        | In<br>hospital           | PD up<br>to 30<br>days | 31<br>days<br>to 6<br>month<br>hs PD | More<br>than 6<br>month<br>hs PD |
|  |                                  |                                   | spirometry every hour,<br>early mobilisation, early<br>chest x-ray,<br>postoperative pain<br>control with oral<br>opioids removal of<br>drain postoperative day<br>2   |   |   |   |                        |                          |                        |                                      |                                  |
| <b>Upper abdominal</b>                                     |                                  |                                   |  |   |   |   |                        |                          |                        |                                      |                                  |
| Nussbaum 2015, <sup>60</sup><br>USA, UBA                   | Standardized<br>care plan        | ERP                               | Selective placement of<br>feeding jejunostomy<br>tubes, epidural catheter,<br>preoperative antibiotics,<br>nasogastric tube (NGT)<br>use, foley catheter,<br>arterial pressure line,<br>central venous catheter,<br>stress ulcer prophylaxis,<br>physical therapy and<br>nutrition therapy<br>assessment, early sips<br>of water and ice, early<br>mobilisation, fluid<br>management | Pre-implementation                          | Pancreatico-<br>duodenectomy              | 242, 63.5 (10.9),<br>56%                                    | Hospital               |                          | SU                     |                                      |                                  |
| Savikko 2015, <sup>61</sup><br>Finland, UBA                | Enhanced<br>Recovery<br>Protocol | ERP                               | Opioid-sparing pain<br>treatment, early<br>mobilisation<br>and oral feeding,<br>restricted use of<br>abdominal drains and<br>catheters   | Pre-ERP protocol                            | Open and<br>laparoscopic liver<br>surgery | 234, 63.4 (range<br>18-86)                                  | University<br>Hospital |                          | Sat, P,<br>QoL,<br>PF  | Sat, P,<br>QoL,<br>PF                |                                  |

| Study<br>(First Author, Date,<br>Country, Study<br>design) | Intervention<br>Name       | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention   | Comparator Name<br>and Brief<br>Description   | Procedure   | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female | Setting                | Outcomes and Time points |                        |                                     |                                 |
|--|----------------------------|-----------------------------------|---|---|---|---|------------------------|--------------------------|------------------------|-------------------------------------|---------------------------------|
|  |                            |                                   |   |   |   |   |                        | In<br>hospital           | PD up<br>to 30<br>days | 31<br>days<br>to 6<br>mont<br>hs PD | More<br>than 6<br>mont<br>hs PD |
| Williamsson 2015, <sup>62</sup><br>Sweden, UBA             | Fast Track<br>Protocol     | ERP                               | Information,<br>preoperative nutrition,<br>and antithrombotic<br>prophylaxis, fasting<br>from midnight,<br>nutrition/fluid/mobilisat<br>ion protocol  | Pre-Fast-Track<br>Protocol:<br>antimicrobial<br>prophylaxis,<br>thoracic<br>epidural/PCA,<br>drains, NG tube,<br>drain removal at<br>surgeons' discretion | Pancreatico-<br>duodenectomy                                    | 100, 68 (range<br>15-81), 43%                               | University<br>Hospital |                          | QoL                    |                                     |                                 |
| Janssen 2020, <sup>63</sup><br>Netherlands, UBA            | Prehabilitation<br>program | Prehabilitatio<br>n               | Multidisciplinary<br>program 5 weeks prior<br>to surgery. Assessment<br>and optimisation of<br>nutritional and physical<br>health, haemoglobin<br>levels and frailty,<br>unsupervised home-<br>based exercise program,<br>dietary advice to<br>maintain minimum<br>required daily intake,<br>comprehensive geriatric<br>assessment when<br>indicated,<br>supplementary<br>interventions to prevent<br>delirium during<br>admission and advice<br>on delirium prevention | Usual care  | Abdominal aortic<br>aneurysm or<br>colorectal cancer<br>surgery | 627, 76.4 (range<br>73-81), 37%                             | Teaching<br>hospital   |                          |                        | PF                                  | PF                              |
| Giacomelli 2020, <sup>64</sup><br>Italy, CBA               | ERAVS                      | ERP                               | Preadmission<br>counselling, admitted<br>day of surgery,  | Traditional protocol  | Aortic surgery  | 67, 71.7 (range<br>47-86), 9%                               | Hospital               | P, Sat                   | PF,<br>MH              |                                     |                                 |

| Study<br>(First Author, Date,<br>Country, Study<br>design) | Intervention<br>Name                  | Broad<br>Intervention<br>Category | Brief description or<br>key features of<br>intervention  | Comparator Name<br>and Brief<br>Description | Procedure                    | Sample: Total<br>sample size,<br>Mean age (SD),<br>% female | Setting | Outcomes and Time points |                        |                                     |                                 |
|--|---------------------------------------|-----------------------------------|--|---|------------------------------|---|---------|--------------------------|------------------------|-------------------------------------|---------------------------------|
|  |                                       |                                   |  |   |                              |   |         | In<br>hospital           | PD up<br>to 30<br>days | 31<br>days<br>to 6<br>mont<br>hs PD | More<br>than 6<br>mont<br>hs PD |
|  |                                       |                                   | preoperative fasting, no bowel preparation, thoracic epidural, short-acting anaesthetic agents, early tube removal, early ambulation, opioid sparing pain management, early oral intake, discharge postoperative day 3 |   |                              |   |         |                          |                        |                                     |                                 |
| Derman 2019, <sup>65</sup><br>USA, UBA                     | Transplant<br>optimisation<br>program | MDT<br>working                    | Cancer specific geriatric assessment followed by 5-hour multidisciplinary evaluation to create an individualised optimisation plan for patients  | Pre-TOP                                     | Stem cell<br>transplantation | 159, 65.6 (range<br>60-75), NR                              |         | PF                       |                        |                                     |                                 |

CABG=Coronary Artery Bypass Graft; CBA=Controlled Before and After Trial; CF=Cognitive function; CT=Controlled Trial, ERAS=Enhanced Recovery After Surgery; ERP=Enhanced Recovery Program/Protocol; FT=Fatigue; GH=General health; IQR=Interquartile Range; I.V.=Intravenous; LOS=Length of Stay; MH=Mental health; NG=Nasogastric; N=Nausea; NR=Not Reported; P=Pain; PA=physical activity; PACP=Preoperative assessment with care plan; PF=Physical function; PO=Post-Operative; POD=Post-Operative Day; QoL=Quality of life; Sat=Satisfaction; SF=Social function; SU=Service utilisation; ; VT=Vitality; TAVR=Transcatheter aortic valve replacement; THA=Total Hip Arthroplasty; TKA=Total Knee Arthroplasty; UBA=Uncontrolled Before And After Trial

**Table 2. Studies from the additional searches which were not prioritised for inclusion in the quantitative synthesis**

| Study<br>(First Author,<br>Date,<br>Country,<br>Study design) | Intervention<br>Name                        | Broad<br>Intervention<br>Category | Brief description<br>or key features of<br>intervention   | Comparator<br>Name and<br>Brief<br>Description | Procedure                 | Sample:<br>Total<br>sample<br>size, Mean<br>age (SD), %<br>female | Setting  | Outcomes and Time points |                           |                                 |                                |
|---|---|-----------------------------------|---|--|---------------------------|---|----------|--------------------------|---------------------------|---------------------------------|--------------------------------|
|   |   |                                   |   |  |                           |   |          | In<br>hospital           | PD<br>up<br>to 30<br>days | 31 days<br>to 6<br>months<br>PD | More<br>than 6<br>months<br>PD |
| Bloom 2021, <sup>71</sup><br>USA, UBA                         | Opioid<br>sparing<br>multimodal<br>protocol | ERP                               | Opioid sparing<br>protocol<br>commenced prior<br>to surgery and<br>continued<br>beyond discharge  | Pre-protocol                                   | Total hip<br>arthroplasty | 1003, 64.1<br>(9.4), 56%  | Hospital |                          | Sat                       |                                 |                                |
| Leiss 2021, <sup>72</sup><br>Germany, CT                      | ERAS  | ERP                               | Patient education<br>and preoperative<br>gait training.<br>Preoperative<br>administration of<br>NSAID (etoricoxib<br>90 mg. Use of<br>short acting<br>spinal<br>anaesthesia and<br>tranexamic acid.<br>Use of a local-<br>infiltration<br>analgesia in<br>periacetabular<br>and<br>subcutaneously.<br>Omission of<br>drains. Early<br>mobilisation. | Usual Care                                     | Total hip<br>arthroplasty | 320, 65.0<br>(10.32),<br>50%                                      | Hospital |                          |                           |                                 | QoL, PF                        |

|  |                    |     |  |                       |  |                             |          |         |  |        |         |
|--|--------------------|-----|--|-----------------------|--|-----------------------------|----------|---------|--|--------|---------|
|  |                    |     | Specially adapted physiotherapy.   |                       |  |                             |          |         |  |        |         |
| Morgan 2021, <sup>73</sup> UK, Cohort      | Enhanced Recovery  | ERP | Patient education, physiotherapy protocol, anaesthetic and analgesic protocol, discharge support   | Non-enhanced recovery | Total shoulder arthroplasty                              | 142, 73.1 (NR), 67%         | Hospital | P       |  | PF,Sat |         |
| Paulsen 2022, <sup>74</sup> Norway, Cohort | Fast track regimen | ERP | Standardised pain medication and information. Early mobilisation. Improved follow up and collection of PROMs   | Hip vs knee           | Joint replacement  | 1508, 71 (range 18-94), 62% | Hospital | QoL, PF |  |        | QoL, PF |
| Porche 2022, <sup>75</sup> USA, Cohort     | ERAS               | ERP | Patient education, intensive anaesthesia evaluation, preoperative and postoperative anaesthesia and pain management protocol, fluid and blood transfusion management, improved | Pre-ERAS              | Level 1-2, Transforaminal lumbar interbody fusion (TLIF) | 58, 73.1 (4.5), 47%         | Hospital | P,SU    |  |        |         |

|  |                  |     |   |               |   |                       |          |        |  |        |  |
|--|------------------|-----|---|---------------|---|-----------------------|----------|--------|--|--------|--|
|  |                  |     | communication, standard bowel regimen, early mobilisation                                       |               |   |                       |          |        |  |        |  |
| Saunders 2021, <sup>76</sup> UK, CT  | Day case pathway | ERP | Early listing priorities, day-case anaesthetic protocol, and early postoperative investigations | Standard case | Total and uncompartmental knee arthroplasty | 129, 63.8 (12.8), 56% | Hospital | P, Sat |  | P, Sat |  |
| CT=Controlled Trial, ERAS=Enhanced Recovery After Surgery; ERP=Enhanced Recovery Program/Protocol; NR=Not Reported; P=Pain; PF=Physical function; PO=Post-Operative; POD=Post-Operative Day; QoL=Quality of life; Sat=Satisfaction; SU=Service utilisation; THA=Total Hip Arthroplasty; TKA=Total Knee Arthroplasty; UBA=Uncontrolled Before and After Trial |                  |     |   |               |   |                       |          |        |  |        |  |

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