Supplemental appendix to Durham et al (2021) Modelling costs of POFP

Further details on instruments employed in study:

**Graded chronic pain scale (GCPS)**
This instrument uses seven items in order to examine the level of pain-related disability and produce an output on an ordinal 5-point scale ranging from Grade 0 (low intensity, low disability) to Grade IV (high disability, severely limiting). It is then possible to split the GCPS output at the Grade II level using Dworkin et al's algorithm (Dworkin et al. 2002) to produce a dichotomized GCPS state of Low pain-related disability (Grade 0 – IIa) and High pain-related disability (Grade IIb-IV).

**EQ-5D-5L**
EQ-5D-5L is a generic health-related preference-based measure consisting of five items that examine: mobility, self-care, usual activities, pain/discomfort, anxiety/depression. Each of the five items is ranked from 1 (perfect health) to 5 (worst health imaginable) and the five rankings are concatenated to produce a score for that health state. It is sensitive to the impacts of POFP (Durham et al. 2015) and produces utilities for each health state it defines between 11111 (perfect health) to 55555 (worst possible health state). These utilities are based on responses from the UK population (the cross-walk algorithm) (van Hout et al. 2012) and range from -0.59 (worst possible state of health, 5555) through to 1 (perfect state of health,11111). The original utilities ('index value set') used for the UK within the cross-walk data set are based on 5324 face-to-face interviews with a representative sample of the UK population {Janssen et al., 2014, #30496}. They are calculated as a result of time-trade off and visual analogue scale techniques with the UK based sample.

**Use of services and productivity questionnaire (USPQ)**
This questionnaire has two parts, the first of which is relevant to the current analysis (Wordsworth and Thompson 2001). This first part collects data on individuals’ specific use of health services over the past six months: visits to health professionals; medication taken; appliances used and interventions experienced; and additional information otherwise unrecorded. Excerpts from this questionnaire for illustration purposes are contained within the appendices of previously published papers (Durham et al. 2016; Breckons et al. 2018).
Table 1 - Single predictor generalised least squares random effects model for utility adjusted for socioeconomic status, origin and duration of pain

| Variable                                           | Coefficient | 95% Confidence Interval |
|----------------------------------------------------|-------------|-------------------------|
| **Dichotomised GCPS state** (Low [0-IIa]; High [IIb-IV]) | -0.08***    | -0.11 -0.05             |
| **Age group**                                       |             |                         |
| 20-29                                               | 0.12        | -0.09 0.33              |
| 30-39                                               | 0.06        | -0.14 0.27              |
| 40-49                                               | 0.05        | -0.16 0.25              |
| 50-59                                               | 0.05        | -0.16 0.25              |
| 60-69                                               | 0.06        | -0.16 0.27              |
| 70-79                                               | -0.01       | -0.24 0.22              |
| 80-89                                               | -0.31*      | -0.58 -0.04             |
| **Male** (Reference category: female)               | -0.03       | -0.10 0.04              |
| **Duration of pain**                                |             |                         |
| <1 year                                             | 0.15***     | 0.07 0.24               |
| 1-4 years                                           | 0.05        | -0.05 0.10              |
| **Origin of pain**                                  |             |                         |
| Musculoskeletal                                     | 0.05        | -0.01 0.12              |
| Neuropathic/vascular                                | 0.13***     | 0.06 0.20               |
| **Dichotomised IMD score**                          |             |                         |
| (Reference category: bottom 50%)                    | 0.02        | -0.03 0.08              |
| **Education**                                       |             |                         |
| No public exams                                     | -0.02       | -0.10 0.07              |
| Secondary exams                                     | -0.01       | -0.06 0.05              |
| **Economic activity**                               |             |                         |
| Employed                                            | 0.10**      | 0.03 0.17               |
| Retired                                             | 0.10        | -0.01 0.20              |
| **Constant**                                        | 0.65        | 0.41 0.88               |

*** P<0.0001; **P<0.01; *P<0.05
Table 2 - Single predictor Generalised Estimating Equation (GEE) model using an identity link function and a Gamma family for total healthcare utilisation cost adjusted for socioeconomic status, origin and duration of pain.

| Variable                                      | Coefficient | 95% Confidence Interval |
|-----------------------------------------------|-------------|--------------------------|
| Dichotomised GCPS state (Low [0-IIa]; High [IIb-IV]) | 221**       | 87 355                   |
| Age group                                     |             |                          |
| 20-29                                         | 9           | -775 792                 |
| 30-39                                         | -67         | -755 621                 |
| 40-49                                         | -137        | -819 545                 |
| 50-59                                         | -106        | -781 570                 |
| 60-69                                         | 9           | -676 695                 |
| 70-79                                         | 240         | -487 966                 |
| 80-89                                         | 274         | -630 1178                |
| Male (Reference category: female)              | -41         | -200 118                 |
| Duration of pain                              |             |                          |
| <1 year                                       | -179**      | -297 -61                 |
| 1-4 years                                     | 105         | -52 262                  |
| Origin of pain                                |             |                          |
| Musculoskeletal                               | -32         | -244 180                 |
| Neuropathic/vascular                          | -216*       | -424 -7                  |
| Dichotomised IMD score (Reference category: bottom 50%) | -62         | -209 85                  |
| Education                                     |             |                          |
| No public exams                               | -40         | -237 157                 |
| Secondary exams                               | 13          | -112 138                 |
| Economic activity                             |             |                          |
| Employed                                      | -354*       | -682 -24                 |
| Retired                                       | -477**      | -828 -128                |
| Constant                                      | 959         | 181 1736                 |

**P<0.01; *P<0.05
Table 3 - Sensitivity analyses for different discounting rates for costs and utilities:

| Discount rate for cost and utility applied in model | Point estimate of average lifetime QALY gained | Point estimate of cost/£ |
|---------------------------------------------------|-----------------------------------------------|--------------------------|
| 0%                                                | 40.35                                         | 56,756                   |
| 7%                                                | 10.37                                         | 14,622                   |
| 10%                                               | 7.63                                          | 10,780                   |
Table 4 – Expanded and collated GCPS transition data over time period of the study

| Collated GCPS starting state (M0-M18) | Collated GCPS end state after 6 months (M6-M24) |
|--------------------------------------|-----------------------------------------------|
|                                      | Collated GCPS starting state (M0-M18) | Collated GCPS end state after 6 months (M6-M24) |
|                                      | n.  | %          | n.  | %          | n.  | %          | n.  | %          | n.  | %          | n.  | %          | n.  | %          | n.  | %          |
|                                      | 0   | 0          | I   | 4.2       | 0   | 0          | 0   | 1.7       | 0   | 0          | 21  | 3.6       |
|                                      | I   | 14 | 51.9      | 187 | 65.2     | 23  | 22.6      | 19  | 22.4      | 6   | 9.7       | 2   | 6.9       | 251 | 42.4       |
|                                      | Ila/Low | 2 | 7.5       | 44  | 15.4     | 59  | 57.9      | 17  | 20        | 6   | 9.7       | 1   | 3.5       | 129 | 21.8       |
|                                      | IIb/High | 2 | 7.5       | 27  | 9.5      | 15  | 14.8      | 29  | 34.2      | 16  | 25.9      | 2   | 6.9       | 91  | 15.4       |
|                                      | III  | 1  | 3.8       | 14  | 4.9      | 4   | 4         | 17  | 23        | 23  | 37.1      | 11  | 38        | 70  | 11.9       |
|                                      | IV   | 0  | 0.0       | 3   | 1.1      | 1   | 1         | 3   | 3.6       | 10  | 16.2      | 13  | 44.9      | 30  | 5.1        |
|                                      | Total| 27 | 100.4     | 287 | 100.3    | 102 | 100.3     | 85  | 100.2     | 62  | 100.3     | 29  | 100.2     | 592 | 100.2      |

*Grey shading indicates movement to, or maintenance of, a high state*