

SUPPLEMENTARY MATERIAL

Opioid vs opioid-free analgesia after discharge from surgery: an international, matched, prospective cohort study

Authors and institutions

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Figure S1: Standardised mean difference of variables between patients discharged with opioid and opioid-free analgesia before and after propensity score matching

Solid vertical line denotes 0 standardised mean difference (SMD). Dotted vertical lines denote 0.1 SMD. Adequacy of propensity score matching is measured by the magnitude of SMD.

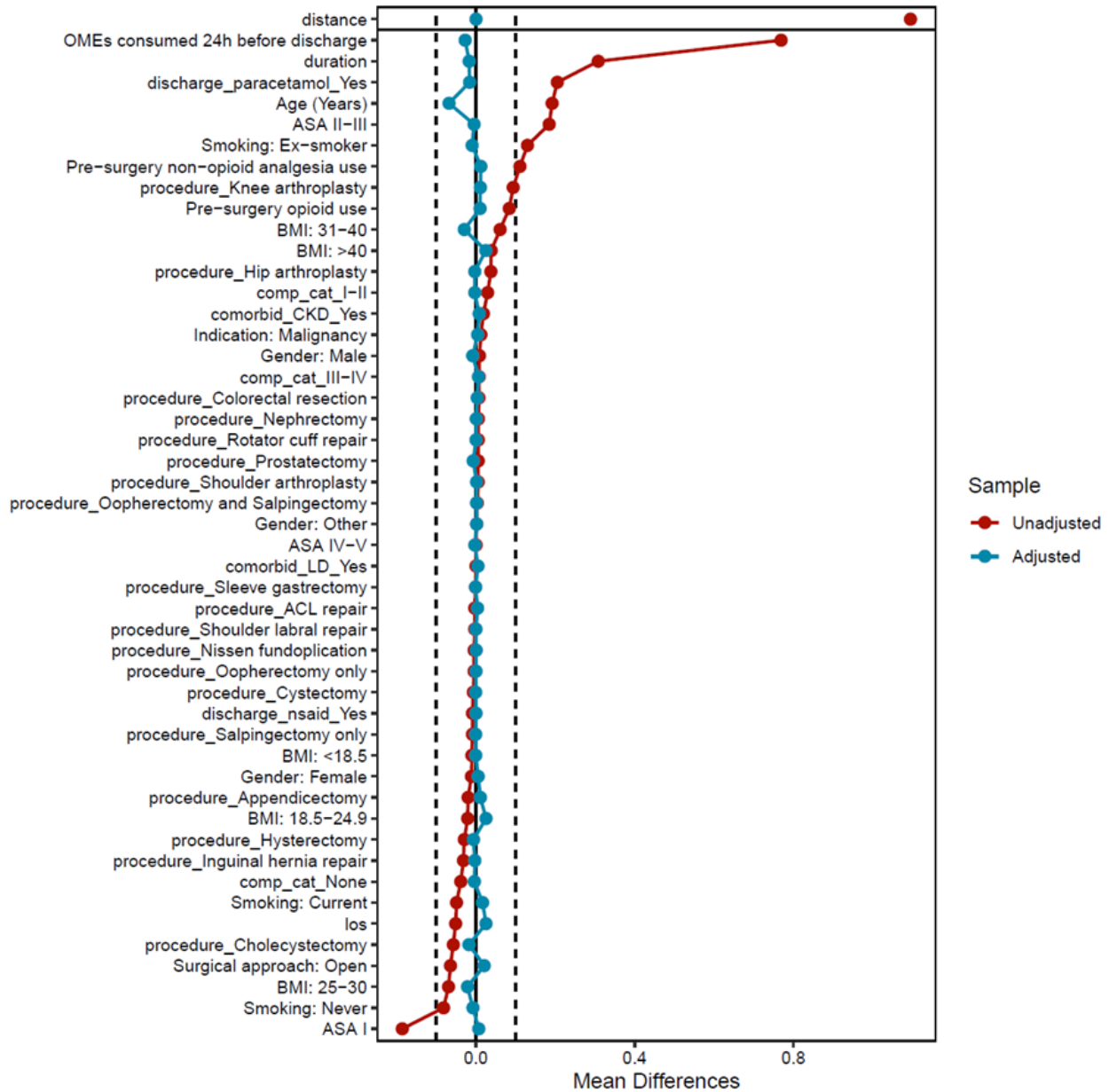


Figure S2: Relationship between quantity of OMEs prescribed at discharge and A) unadjusted time in severe pain and B) unadjusted patient satisfaction with pain treatment adjusted for patient demographics

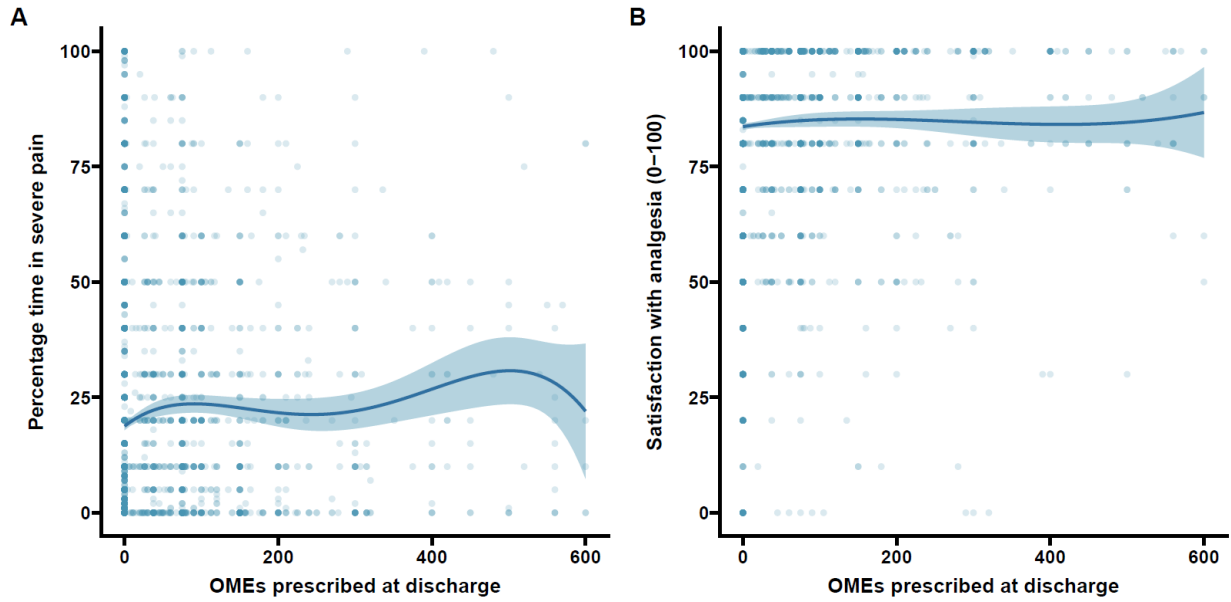


Table S1: Contributions to study by country

| Country | Number of centres | Cases | OECD classification |
|-------------------------|-------------------|-------|---------------------|
| Australia | 41 | 813 | HIC |
| Egypt | 10 | 594 | MIC |
| New Zealand | 12 | 560 | HIC |
| Libya | 10 | 372 | MIC |
| Türkiye | 14 | 296 | MIC |
| Jordan | 5 | 225 | MIC |
| Palestinian Territories | 3 | 218 | MIC |
| Greece | 6 | 207 | HIC |
| Italy | 5 | 187 | HIC |
| Pakistan | 4 | 136 | MIC |
| Russia | 1 | 121 | MIC |
| Sudan | 9 | 119 | LIC |
| Nigeria | 7 | 99 | MIC |
| Spain | 2 | 94 | HIC |
| Algeria | 3 | 56 | MIC |
| Iraq | 1 | 33 | MIC |
| United States | 2 | 28 | HIC |
| Malaysia | 2 | 27 | MIC |
| Saudi Arabia | 1 | 22 | HIC |
| Romania | 1 | 18 | MIC |
| Colombia | 1 | 12 | MIC |
| Lithuania | 1 | 12 | HIC |
| Tunisia | 1 | 11 | MIC |
| Mexico | 1 | 9 | MIC |
| Syria | 1 | 4 | MIC |

HIC: high income country, MIC: middle income country, LIC: low income country

Table S2: Baseline comorbidities of patients

| | Variable | No opioids | Opioids | Total | p |
|-----------------|--------------------|--------------------|--------------------|--------------|----------|
| | Total N (%) | 2962 (69.3) | 1311 (30.7) | 4273 | |
| MI or CHF | No | 2808 (94.8) | 1227 (93.6) | 4035 (94.4) | 0.13 |
| | Yes | 154 (5.2) | 84 (6.4) | 238 (5.6) | |
| PVD | No | 2877 (97.1) | 1276 (97.3) | 4153 (97.2) | 0.791 |
| | Yes | 85 (2.9) | 35 (2.7) | 120 (2.8) | |
| CVA or TIA | No | 2903 (98.0) | 1285 (98.0) | 4188 (98.0) | 1 |
| | Yes | 59 (2.0) | 26 (2.0) | 85 (2.0) | |
| PUD | No | 2900 (97.9) | 1285 (98.0) | 4185 (97.9) | 0.907 |
| | Yes | 62 (2.1) | 26 (2.0) | 88 (2.1) | |
| Diabetes | No | 2559 (86.4) | 1115 (85.0) | 3674 (86.0) | 0.263 |
| | Yes | 403 (13.6) | 196 (15.0) | 599 (14.0) | |
| CKD | No | 2913 (98.3) | 1268 (96.7) | 4181 (97.8) | 0.001 |
| | Yes | 49 (1.7) | 43 (3.3) | 92 (2.2) | |
| Liver disease | No | 2910 (98.2) | 1283 (97.9) | 4193 (98.1) | 0.47 |
| | Yes | 52 (1.8) | 28 (2.1) | 80 (1.9) | |
| Comorbid Cancer | No | 2749 (92.8) | 1153 (87.9) | 3902 (91.3) | <0.001 |
| | Yes | 213 (7.2) | 158 (12.1) | 371 (8.7) | |

MI, myocardial infarction history; CHF, congestive heart failure; PVD, peripheral vascular disease; CVA, cerebrovascular accident; TIA, transient ischaemic attack; PUD, peptic ulcer disease.; CKD, chronic kidney disease

Table S3: Balance diagnostics

| Variable | Type | Mean SMD unadj | Mean SMD adj |
|------------------------------------|----------|----------------|--------------|
| distance | Distance | 1.007616832 | 0.00017236 |
| Age (Years) | Contin. | 0.149058 | -0.050139333 |
| Sex: Female | Binary | -0.00524441 | 0.009990547 |
| Sex: Male | Binary | 0.002956081 | -0.012278876 |
| Sex: Other | Binary | 0.00228833 | 0.00228833 |
| ASA I | Binary | -0.169717824 | 0.002463279 |
| ASA II-III | Binary | 0.166412571 | -0.004285986 |
| ASA IV-V | Binary | 0.003305253 | 0.001822707 |
| BMI: 18.5-24.9 | Binary | -0.024395843 | 0.010543382 |
| BMI: 25-30 | Binary | -0.068929914 | -0.003954364 |
| BMI: 31-40 | Binary | 0.064590509 | -0.01080799 |
| BMI: >40 | Binary | 0.037283805 | 0.003637039 |
| BMI: <18.5 | Binary | -0.008548556 | 0.000581933 |
| Comorbid CKD | Binary | 0.016256513 | -0.003281365 |
| Comorbid liver disease | Binary | 0.003802037 | 0.004374859 |
| Smoking: Never | Binary | -0.070994432 | 0.002851856 |
| Smoking: Current | Binary | -0.049177788 | -0.002056171 |
| Smoking: Ex-smoker | Binary | 0.12017222 | -0.000795684 |
| Procedure: Appendicectomy | Binary | 0.007596863 | 0.007001575 |
| Procedure: Cholecystectomy | Binary | -0.033175885 | 0.020255929 |
| Procedure: Colorectal resection | Binary | 0.001566499 | -0.014520139 |

| | | | |
|---|--------|--------------|--------------|
| Procedure: Inguinal hernia repair | Binary | -0.044810673 | 0.009403452 |
| Procedure: Nissen fundoplication | Binary | -0.003951141 | 5.27E-05 |
| Procedure: Sleeve gastrectomy | Binary | -0.00052457 | 0.00089529 |
| Procedure: ACL repair | Binary | -0.003225448 | -0.000448776 |
| Procedure: Knee arthroplasty | Binary | 0.074991077 | -0.002822054 |
| Procedure: Hip arthroplasty | Binary | 0.032275593 | 0.001255537 |
| Procedure: Rotator cuff repair | Binary | 0.004676835 | 0.001749313 |
| Procedure: Shoulder arthroplasty | Binary | 0.005352054 | -0.00361996 |
| Procedure: Shoulder labral repair | Binary | -0.00328854 | -1.55E-05 |
| Procedure: Cystectomy | Binary | -0.006401966 | -0.001238054 |
| Procedure: Nephrectomy | Binary | 0.008053704 | -0.007387922 |
| Procedure: Prostatectomy | Binary | 0.004414936 | -0.004025605 |
| Procedure: Hysterectomy | Binary | -0.031971203 | -0.008389155 |
| Procedure: Oophorectomy and Salpingectomy | Binary | 0.000463022 | 0.001912783 |
| Procedure: Oophorectomy only | Binary | -0.004801475 | 0.00088914 |
| Procedure: Salpingectomy only | Binary | -0.007239681 | -0.000948612 |
| Surgical approach: Open | Binary | -0.119120762 | 0.02417267 |

| | | | |
|---|---------|--------------|--------------|
| Indication: Malignancy | Binary | 0.005709132 | -0.021959313 |
| Urgency: Emergency | Binary | 0.084354017 | -0.001681727 |
| Operative duration (minutes) | Contin. | 0.219513659 | -0.081228276 |
| Clavien Dindo Complicatio Grade: None | Binary | -0.045320384 | 0.017599561 |
| Clavien Dindo Complicatio Grade:_ I-II | Binary | 0.037188419 | -0.021473516 |
| Clavien Dindo Complicatio Grade:_ III-IV | Binary | 0.008131965 | 0.003873954 |
| OMEs consumed 24h before discharge | Contin. | 0.323538167 | 0.020525119 |
| Pre-surgery opioid use | Binary | 0.082030407 | 0.025397245 |
| Pre-surgery non-opioid analgesia use | Binary | 0.097242416 | 0.005469069 |
| Length of stay | Contin. | -0.067801416 | -0.056134528 |
| Discharge paracetamol prescribed | Binary | 0.180030784 | -0.01173816 |
| Discharge non-steroid anti-inflammatory drug prescribed | Binary | -0.017167751 | -0.010622419 |

ASA: American Association of Anaesthesiologists Grade, BMI: body mass index (kg/m²). CKD: Chronic kidney disease. OME: oral morphine equivalents

Table S4: Negative binomial regression model of factors associated with percent time in severe pain post-discharge

| Variable | Risk ratio | 95% CI | p-value |
|----------------------------|------------|---------------|---------|
| Intercept | 23.45 | 15.97 - 34.44 | 0 |
| Age (Years) | 0.99 | 0.99 - 1 | 0.011 |
| Sex: Female | Ref | | |
| Sex: Male | 0.87 | 0.77 - 0.99 | 0.034 |
| Sex: Other | 0.99 | 0.18 - 5.36 | 0.994 |
| ASA I | Ref | | |
| ASA II-III | 1.01 | 0.86 - 1.18 | 0.914 |
| ASA IV-V | 1.63 | 0.96 - 2.8 | 0.075 |
| BMI: 20-24 | Ref | | |
| BMI: 25-30 | 1.07 | 0.92 - 1.25 | 0.358 |
| BMI: 31-40 | 1.18 | 1.02 - 1.38 | 0.03 |
| BMI: >40 | 1.13 | 0.88 - 1.47 | 0.338 |
| BMI: <18.5 | 1.84 | 1.03 - 3.28 | 0.042 |
| Smoking: Never | Ref | | |
| Smoking: Current | 1.04 | 0.88 - 1.23 | 0.637 |
| Smoking: Ex-smoker | 1.13 | 0.98 - 1.29 | 0.095 |
| Surgical approach: MIS | Ref | | |
| Surgical approach: Open | 1.08 | 0.92 - 1.26 | 0.351 |
| Indication: Benign | Ref | | |
| Indication: Malignancy | 0.73 | 0.56 - 0.95 | 0.025 |
| Urgency: Elective | | | |
| Urgency: Emergency | 0.81 | 0.67 - 0.97 | 0.027 |
| Pre-surgery opioid use: No | Ref | | |

| | | | |
|---|------|-------------|-------|
| Pre-surgery opioid use: Yes | 1.14 | 0.88 - 1.49 | 0.321 |
| Pre-surgery non-opioid analgesia use: No | Ref | | |
| Pre-surgery non-opioid analgesia use: Yes | 1.07 | 0.96 - 1.21 | 0.225 |
| Procedure: Appendectomy | Ref | | |
| Procedure: Cholecystectomy | 0.71 | 0.58 - 0.86 | 0.001 |
| Procedure: Colorectal resection | 0.91 | 0.62 - 1.33 | 0.628 |
| Procedure: Inguinal hernia repair | 0.83 | 0.62 - 1.11 | 0.209 |
| Procedure: Nissen fundoplication | 0.6 | 0.28 - 1.3 | 0.194 |
| Procedure: Sleeve gastrectomy | 0.68 | 0.42 - 1.11 | 0.128 |
| Procedure: ACL repair | 1.33 | 0.86 - 2.07 | 0.199 |
| Procedure: Knee arthroplasty | 1.4 | 1.05 - 1.88 | 0.023 |
| Procedure: Hip arthroplasty | 1.18 | 0.88 - 1.58 | 0.269 |
| Procedure: Rotator cuff repair | 1.53 | 0.79 - 2.94 | 0.206 |
| Procedure: Shoulder arthroplasty | 1.13 | 0.62 - 2.05 | 0.689 |
| Procedure: Shoulder labral repair | 0.91 | 0.17 - 4.99 | 0.914 |
| Procedure: Cystectomy | 0.72 | 0.32 - 1.61 | 0.423 |
| Procedure: Nephrectomy | 1.24 | 0.82 - 1.87 | 0.304 |
| Procedure: Prostatectomy | 0.88 | 0.57 - 1.38 | 0.591 |
| Procedure: Hysterectomy | 0.89 | 0.62 - 1.27 | 0.517 |
| Procedure: Oophorectomy and salpingectomy | 0.95 | 0.55 - 1.66 | 0.868 |
| Procedure: Oophorectomy only | 1.35 | 0.44 - 4.13 | 0.599 |
| Procedure: Salpingectomy only | 0.94 | 0.43 - 2.02 | 0.868 |
| Clavien Dindo: None | Ref | | |
| Clavien Dindo: I-II | 1.24 | 1.06 - 1.45 | 0.01 |
| Clavien Dindo: III-IV | 1 | 0.59 - 1.7 | 0.994 |
| Discharge opioids: No | Ref | | |

| | | | |
|---|------|-------------|-------|
| Discharge opioids: Yes | 1.52 | 1.31 - 1.76 | 0 |
| OMEs consumed 24h before discharge (per unit) | 1 | 1-1 | 0.143 |

ASA: American Association of Anaesthesiologists Grade, BMI: body mass index (kg/m²), MIS: minimally invasive surgery. Mixed-effects model with country and hospital centre as random effects.

Table S5: Mixed-effects linear regression model of factors associated with satisfaction with pain treatment (0-100)

| Variable | Coefficient | 95% CI | p-value |
|----------------------------|-------------|----------------|---------|
| Intercept | 82.76 | 78.77 - 86.74 | 0 |
| Age (Years) | 0.04 | -0.02 - 0.09 | 0.191 |
| Sex: Female | Ref | | |
| Sex: Male | 2.18 | 0.15 - 4.21 | 0.046 |
| Sex: Other | 2.41 | -18.55 - 23.36 | 0.822 |
| ASA I | Ref | | |
| ASA II-III | -1.02 | -2.99 - 0.94 | 0.31 |
| ASA IV-V | -8.17 | -17.78 - 1.44 | 0.11 |
| BMI: 20-24 | Ref | | |
| BMI: 25-30 | -1.84 | -3.96 - 0.28 | 0.098 |
| BMI: 31-40 | -1.34 | -3.39 - 0.72 | 0.207 |
| BMI: >40 | -3.01 | -7.25 - 1.23 | 0.178 |
| BMI: <18.5 | -12.22 | -20.7 - -3.74 | 0.009 |
| Smoking: Never | Ref | | |
| Smoking: Current | -2.38 | -4.75 - -0.02 | 0.056 |
| Smoking: Ex-smoker | -0.2 | -2.31 - 1.91 | 0.852 |
| Surgical approach: MIS | Ref | | |
| Surgical approach: Open | -1.4 | -3.51 - 0.72 | 0.201 |
| Indication: Benign | Ref | | |
| Indication: Malignancy | 3.64 | 0.27 - 7 | 0.04 |
| Urgency: Elective | Ref | | |
| Urgency: Emergency | 1.25 | -0.86 - 3.36 | 0.248 |
| Pre-surgery opioid use: No | Ref | | |

| | | | |
|---|--------|----------------|-------|
| Pre-surgery opioid use: Yes | -3.76 | -7.19 - -0.33 | 0.041 |
| Pre-surgery non-opioid analgesia use: No | Ref | | |
| Pre-surgery non-opioid analgesia use: Yes | -0.87 | -2.38 - 0.65 | 0.262 |
| Procedure: Appendectomy | Ref | | |
| Procedure: Cholecystectomy | 3.15 | 0.61 - 5.7 | 0.018 |
| Procedure: Colorectal resection | -2.94 | -6.61 - 0.73 | 0.119 |
| Procedure: Inguinal hernia repair | 1.6 | -1.52 - 4.71 | 0.316 |
| Procedure: Nissen fundoplication | -5.38 | -15.24 - 4.48 | 0.285 |
| Procedure: Sleeve gastrectomy | 3.14 | -2.91 - 9.18 | 0.311 |
| Procedure: ACL repair | -10.01 | -15.56 - -4.47 | 0 |
| Procedure: Knee arthroplasty | -3.27 | -7.46 - 0.92 | 0.131 |
| Procedure: Hip arthroplasty | -2.05 | -6.65 - 2.55 | 0.385 |
| Procedure: Rotator cuff repair | -5.38 | -13.05 - 2.3 | 0.17 |
| Procedure: Shoulder arthroplasty | -0.65 | -12.01 - 10.72 | 0.912 |
| Procedure: Shoulder labral repair | 2.81 | -19.99 - 25.62 | 0.809 |
| Procedure: Cystectomy | -6.37 | -22.17 - 9.43 | 0.438 |
| Procedure: Nephrectomy | -3.34 | -8.64 - 1.97 | 0.223 |
| Procedure: Prostatectomy | -3.62 | -9.33 - 2.08 | 0.218 |
| Procedure: Hysterectomy | 1.09 | -3.88 - 6.06 | 0.67 |
| Procedure: Oophorectomy and salpingectomy | -4.59 | -12.82 - 3.64 | 0.279 |
| Procedure: Oophorectomy only | -3.32 | -19.18 - 12.55 | 0.683 |
| Procedure: Salpingectomy only | 3.3 | -6.78 - 13.39 | 0.522 |
| Clavien Dindo: None | Ref | | |
| Clavien Dindo: I-II | -3.62 | -6.47 - -0.78 | 0.023 |
| Clavien Dindo: III-IV | -1.99 | -8.01 - 4.03 | 0.518 |
| Discharge opioids: No | Ref | | |

| | | | |
|---|------|--------------|-------|
| Discharge opioids: Yes | 0.92 | -1.52 - 3.36 | 0.468 |
| OMEs consumed 24h before discharge (per unit) | 0 | -0.01 - 0 | 0.341 |

ASA: American Association of Anaesthesiologists Grade, BMI: body mass index (kg/m²), MIS: minimally invasive surgery. Mixed-effects model with country and hospital centre as random effects.

Table S6: Mixed-effects linear regression model of factors associated with EQ-5D-5L composite score (0-100)

| Variable | Coefficient | 95% CI | p-value |
|----------------------------|--------------------|----------------|----------------|
| Intercept | 86.25 | 82.31 - 90.2 | 0 |
| Age (Years) | 0.03 | -0.02 - 0.07 | 0.286 |
| Sex: Female | Ref | | |
| Sex: Male | 4.28 | 2.41 - 6.14 | 0 |
| Sex: Other | 18.31 | -0.11 - 36.73 | 0.051 |
| ASA I | Ref | | |
| ASA II-III | -2.01 | -3.52 - -0.5 | 0.01 |
| ASA IV-V | -6.44 | -13.48 - 0.6 | 0.081 |
| BMI: 20-24 | Ref | | |
| BMI: 25-30 | -0.98 | -2.54 - 0.58 | 0.222 |
| BMI: 31-40 | -2.44 | -4.73 - -0.15 | 0.048 |
| BMI: >40 | -1.98 | -6.04 - 2.08 | 0.351 |
| BMI: <18.5 | -15.85 | -25.53 - -6.17 | 0.006 |
| Smoking: Never | Ref | | |
| Smoking: Current | -0.85 | -3.09 - 1.4 | 0.465 |
| Smoking: Ex-smoker | -0.26 | -2.12 - 1.61 | 0.788 |
| Surgical approach: MIS | Ref | | |
| Surgical approach: Open | -1.95 | -3.91 - 0.01 | 0.058 |
| Indication: Benign | Ref | | |
| Indication: Malignancy | 1.31 | -1.83 - 4.45 | 0.418 |
| Urgency: Elective | Ref | | |
| Urgency: Emergency | -1.06 | -3.03 - 0.92 | 0.299 |
| Pre-surgery opioid use: No | Ref | | |

| | | | |
|---|--------|-----------------|-------|
| Pre-surgery opioid use: Yes | -5.03 | -8.21 - -1.84 | 0.005 |
| Pre-surgery non-opioid analgesia use: No | Ref | | |
| Pre-surgery non-opioid analgesia use: Yes | -1.32 | -2.86 - 0.23 | 0.099 |
| Procedure: Appendectomy | Ref | | |
| Procedure: Cholecystectomy | 4.36 | 1.9 - 6.83 | 0.001 |
| Procedure: Colorectal resection | -1.58 | -5.9 - 2.73 | 0.479 |
| Procedure: Inguinal hernia repair | -1.79 | -5.69 - 2.11 | 0.378 |
| Procedure: Nissen fundoplication | -8.26 | -16.77 - 0.25 | 0.057 |
| Procedure: Sleeve gastrectomy | 0.64 | -6.05 - 7.32 | 0.853 |
| Procedure: ACL repair | -18.44 | -24.62 - -12.27 | 0 |
| Procedure: Knee arthroplasty | -10.96 | -15.79 - -6.12 | 0 |
| Procedure: Hip arthroplasty | -13.3 | -19.16 - -7.44 | 0 |
| Procedure: Rotator cuff repair | -11.49 | -19.56 - -3.41 | 0.007 |
| Procedure: Shoulder arthroplasty | -15.15 | -22.36 - -7.95 | 0 |
| Procedure: Shoulder labral repair | -0.61 | -20.2 - 18.98 | 0.952 |
| Procedure: Cystectomy | 5.01 | -4.91 - 14.92 | 0.325 |
| Procedure: Nephrectomy | -8.54 | -13.95 - -3.14 | 0.004 |
| Procedure: Prostatectomy | -4.89 | -10.95 - 1.17 | 0.126 |
| Procedure: Hysterectomy | -2.3 | -8.88 - 4.28 | 0.503 |
| Procedure: Oophorectomy and salpingectomy | -4.19 | -11.07 - 2.69 | 0.236 |
| Procedure: Oophorectomy only | -7.01 | -21 - 6.98 | 0.328 |
| Procedure: Salpingectomy only | 1.8 | -7.12 - 10.72 | 0.693 |
| Clavien Dindo: None | Ref | | |
| Clavien Dindo: I-II | -1.72 | -3.68 - 0.25 | 0.096 |
| Clavien Dindo: III-IV | -10.21 | -17.7 - -2.72 | 0.014 |
| Discharge opioids: No | Ref | | |

| | | | |
|---|-------|---------------|-------|
| Discharge opioids: Yes | -2.27 | -3.82 - -0.72 | 0.005 |
| OMEs consumed 24h before discharge (per unit) | 0 | -0.01 - 0 | 0.44 |

ASA: American Association of Anaesthesiologists Grade, BMI: body mass index (kg/m²), MIS: minimally invasive surgery. Mixed-effects model with country and hospital centre as random effects.

Table S7: Mixed-effects linear regression model of factors associated with EQ-VAS QoL score (0-100)

| Variable | Coefficient | 95% CI | p-value |
|-------------------------|-------------|---------------|---------|
| Intercept | 87.59 | 83.72 - 91.46 | 0 |
| Age (Years) | -0.08 | -0.14 - -0.03 | 0.006 |
| Sex: Female | Ref | | |
| Sex: Male | 1.7 | 0.16 - 3.24 | 0.034 |
| Sex: Other | 6.13 | -12.8 - 25.06 | 0.526 |
| ASA I | Ref | | |
| ASA II-III | -0.57 | -2.28 - 1.13 | 0.512 |
| ASA IV-V | -5.17 | -11.48 - 1.13 | 0.111 |
| BMI: 20-24 | Ref | | |
| BMI: 25-30 | -1.19 | -2.67 - 0.28 | 0.113 |
| BMI: 31-40 | -2.82 | -4.95 - -0.7 | 0.014 |
| BMI: >40 | -5.26 | -9.04 - -1.48 | 0.012 |
| BMI: <18.5 | -12.54 | -20.28 - -4.8 | 0.004 |
| Smoking: Never | Ref | | |
| Smoking: Current | -1.19 | -2.67 - 0.28 | 0.113 |
| Smoking: Ex-smoker | -2.82 | -4.95 - -0.7 | 0.014 |
| Surgical approach: MIS | Ref | | |
| Surgical approach: Open | -1.63 | -3.31 - 0.05 | 0.058 |
| Indication: Benign | Ref | | |
| Indication: Malignancy | 0.58 | -3.14 - 4.29 | 0.764 |

| | | | |
|---|--------|--------------------|-------|
| Urgency: Elective | Ref | | |
| Urgency: Emergency | -1.35 | -3 - 0.3 | 0.109 |
| Pre-surgery opioid use: No | Ref | | |
| Pre-surgery opioid use: Yes | -2.59 | -5.84 - 0.65 | 0.131 |
| Pre-surgery non-opioid analgesia use: No | Ref | | |
| Pre-surgery non-opioid analgesia use: Yes | -0.83 | -2.41 - 0.76 | 0.311 |
| Procedure: Appendectomy | Ref | | |
| Procedure: Cholecystectomy | 3.56 | 1.37 - 5.75 | 0.002 |
| Procedure: Colorectal resection | -3.71 | -7.55 - 0.12 | 0.065 |
| Procedure: Inguinal hernia repair | 1.25 | -1.92 - 4.42 | 0.441 |
| Procedure: Nissen fundoplication | -3.23 | -12.36 - 5.9 | 0.488 |
| Procedure: Sleeve gastrectomy | 2.98 | -3.46 - 9.41 | 0.37 |
| Procedure: ACL repair | -5.57 | -10.62 - - 0.53 | 0.031 |
| Procedure: Knee arthroplasty | -0.92 | -4.74 - 2.9 | 0.638 |
| Procedure: Hip arthroplasty | -1.19 | -6.14 - 3.75 | 0.64 |
| Procedure: Rotator cuff repair | 0.52 | -6.53 - 7.57 | 0.885 |
| Procedure: Shoulder arthroplasty | 1.95 | -6.17 - 10.08 | 0.64 |
| Procedure: Shoulder labral repair | -10.26 | -29.45 - 8.93 | 0.295 |
| Procedure: Cystectomy | 0.36 | -10.22 - 10.93 | 0.948 |
| Procedure: Nephrectomy | -6.44 | -11.08 - -1.8 | 0.008 |
| Procedure: Prostatectomy | 0.78 | -4.4 - 5.96 | 0.768 |
| Procedure: Hysterectomy | -3.05 | -7.6 - 1.5 | 0.196 |
| Procedure: Oophorectomy and salpingectomy | -3.27 | -9.72 - 3.17 | 0.321 |
| Procedure: Oophorectomy only | -0.65 | -14.38 - 13.08 | 0.926 |
| Procedure: Salpingectomy only | -4.25 | -12.67 - 4.16 | 0.322 |

| | | | |
|---|--------|--------------------|-------|
| Clavien Dindo: None | Ref | | |
| Clavien Dindo: I-II | -1.1 | -3.17 - 0.96 | 0.303 |
| Clavien Dindo: III-IV | -10.38 | -16.89 - - 3.86 | 0.003 |
| Discharge opioids: No | Ref | | |
| Discharge opioids: Yes | -2.82 | -4.51 - -1.14 | 0.002 |
| OMEs consumed 24h before discharge (per unit) | 0 | -0.01 - 0.01 | 0.758 |

ASA: American Association of Anaesthesiologists Grade, BMI: body mass index (kg/m²), MIS: minimally invasive surgery. Mixed-effects model with country and hospital centre as random effects.

Table S8: Mixed-effects binary logistic regression model of factors associated with healthcare presentations for further pain relief

| Variable | Odds ratio | 95% CI | p-value |
|----------------------------|------------|--------------|---------|
| Intercept | 0.09 | 0.05 - 0.19 | 0 |
| Age (Years) | 0.99 | 0.98 - 1 | 0.065 |
| Sex: Female | Ref | | |
| Sex: Male | 1.03 | 0.77 - 1.38 | 0.825 |
| Sex: Other | 2.05 | 0.15 - 28.23 | 0.59 |
| ASA I | Ref | | |
| ASA II-III | 1.28 | 0.92 - 1.78 | 0.138 |
| ASA IV-V | 3.65 | 1.29 - 10.32 | 0.016 |
| BMI: 20-24 | Ref | | |
| BMI: 25-30 | 1.3 | 0.82 - 2.08 | 0.275 |
| BMI: 31-40 | 1.29 | 0.82 - 2.03 | 0.288 |
| BMI: >40 | 1.33 | 0.62 - 2.84 | 0.469 |
| BMI: <18.5 | 3.5 | 1.1 - 11.11 | 0.04 |
| Smoking: Never | Ref | | |
| Smoking: Current | 1.39 | 0.93 - 2.08 | 0.113 |
| Smoking: Ex-smoker | 0.97 | 0.62 - 1.51 | 0.897 |
| Surgical approach: MIS | Ref | | |
| Surgical approach: Open | 1.46 | 1.03 - 2.09 | 0.037 |
| Indication: Benign | Ref | | |
| Indication: Malignancy | 0.4 | 0.2 - 0.81 | 0.014 |
| Urgency: Elective | Ref | | |
| Urgency: Emergency | 0.72 | 0.44 - 1.19 | 0.21 |
| Pre-surgery opioid use: No | Ref | | |

| | | | |
|---|------|---------------|-------|
| Pre-surgery opioid use: Yes | 2.52 | 1.62 - 3.91 | 0 |
| Pre-surgery non-opioid analgesia use: No | Ref | | |
| Pre-surgery non-opioid analgesia use: Yes | 1.08 | 0.79 - 1.46 | 0.632 |
| Procedure: Appendectomy | Ref | | |
| Procedure: Cholecystectomy | 0.72 | 0.47 - 1.11 | 0.143 |
| Procedure: Colorectal resection | 0.84 | 0.41 - 1.71 | 0.624 |
| Procedure: Inguinal hernia repair | 0.55 | 0.27 - 1.1 | 0.094 |
| Procedure: Nissen fundoplication | 1.11 | 0.18 - 6.96 | 0.913 |
| Procedure: Sleeve gastrectomy | 0.92 | 0.26 - 3.31 | 0.902 |
| Procedure: ACL repair | 0.96 | 0.33 - 2.81 | 0.942 |
| Procedure: Knee arthroplasty | 1.3 | 0.55 - 3.06 | 0.556 |
| Procedure: Hip arthroplasty | 0.68 | 0.27 - 1.7 | 0.411 |
| Procedure: Rotator cuff repair | 0.2 | 0.02 - 1.74 | 0.145 |
| Procedure: Shoulder arthroplasty | 1.26 | 0.31 - 5.16 | 0.754 |
| Procedure: Shoulder labral repair | 3.26 | 0.08 - 137.67 | 0.537 |
| Procedure: Cystectomy | 0.04 | 0 - 154.37 | 0.435 |
| Procedure: Nephrectomy | 1.18 | 0.43 - 3.19 | 0.752 |
| Procedure: Prostatectomy | 0.67 | 0.18 - 2.49 | 0.557 |
| Procedure: Hysterectomy | 0.66 | 0.25 - 1.75 | 0.41 |
| Procedure: Oophorectomy and salpingectomy | 0.59 | 0.09 - 3.98 | 0.591 |
| Procedure: Oophorectomy only | 1.55 | 0.19 - 12.65 | 0.685 |
| Procedure: Salpingectomy only | 0.83 | 0.18 - 3.77 | 0.806 |
| Clavien Dindo: None | Ref | | |
| Clavien Dindo: I-II | 2.03 | 1.45 - 2.85 | 0 |
| Clavien Dindo: III-IV | 0.58 | 0.1 - 3.24 | 0.536 |
| Discharge opioids: No | Ref | | |
| Discharge opioids: Yes | 1.01 | 0.7 - 1.46 | 0.948 |

| | | | |
|---|---|-----|-------|
| OMEs consumed 24h before discharge (per unit) | 1 | 1-1 | 0.004 |
|---|---|-----|-------|

ASA: American Association of Anaesthesiologists Grade, BMI: body mass index (kg/m²), MIS: minimally invasive surgery. Mixed-effects model with country and hospital centre as random effects.

Table S9: Mixed-effects binary logistic regression model of factors associated with healthcare presentations for side effects of analgesia

| Variable | Odds ratio | 95% CI | p-value |
|--|------------|--------------|---------|
| Intercept | 0.02 | 0.01 - 0.07 | 0 |
| Age (Years) | 1.01 | 0.99 - 1.03 | 0.221 |
| Sex: Female | Ref | | |
| Sex: Male | 0.55 | 0.36 - 0.85 | 0.009 |
| Sex: Other | 4.13 | 0.23 - 74.03 | 0.335 |
| ASA I | Ref | | |
| ASA II-III | 0.85 | 0.52 - 1.41 | 0.54 |
| ASA IV-V | 1.7 | 0.46 - 6.23 | 0.423 |
| BMI: 20-24 | Ref | | |
| BMI: 25-30 | 0.65 | 0.39 - 1.11 | 0.125 |
| BMI: 31-40 | 0.69 | 0.38 - 1.27 | 0.245 |
| BMI: >40 | 0.46 | 0.18 - 1.15 | 0.099 |
| BMI: <18.5 | 1.69 | 0.47 - 6.13 | 0.427 |
| Smoking: Never | Ref | | |
| Smoking: Current | 2.1 | 1.18 - 3.73 | 0.015 |
| Smoking: Ex-smoker | 1.09 | 0.65 - 1.85 | 0.74 |
| Surgical approach: MIS | Ref | | |
| Surgical approach: Open | 0.88 | 0.51 - 1.5 | 0.633 |
| Indication: Benign | Ref | | |
| Indication: Malignancy | 1.43 | 0.53 - 3.83 | 0.48 |
| Urgency: Elective | Ref | | |
| Urgency: Emergency | 0.8 | 0.37 - 1.72 | 0.573 |
| Pre-surgery opioid use: No | Ref | | |
| Pre-surgery opioid use: Yes | 1.37 | 0.65 - 2.91 | 0.413 |
| Pre-surgery non-opioid analgesia use: No | Ref | | |

| | | | |
|---|------|---------------|-------|
| Pre-surgery non-opioid analgesia use: Yes | 1.65 | 1.03 - 2.63 | 0.043 |
| Procedure: Appendectomy | Ref | | |
| Procedure: Cholecystectomy | 0.5 | 0.23 - 1.12 | 0.098 |
| Procedure: Colorectal resection | 0.24 | 0.08 - 0.74 | 0.014 |
| Procedure: Inguinal hernia repair | 0.86 | 0.34 - 2.13 | 0.738 |
| Procedure: Nissen fundoplication | 0.12 | 0 - 82.67 | 0.527 |
| Procedure: Sleeve gastrectomy | 2.12 | 0.42 - 10.57 | 0.363 |
| Procedure: ACL repair | 1.17 | 0.32 - 4.26 | 0.807 |
| Procedure: Knee arthroplasty | 1.14 | 0.4 - 3.29 | 0.805 |
| Procedure: Hip arthroplasty | 0.57 | 0.19 - 1.71 | 0.318 |
| Procedure: Rotator cuff repair | 0.49 | 0.06 - 4.28 | 0.517 |
| Procedure: Shoulder arthroplasty | 2.96 | 0.7 - 12.63 | 0.146 |
| Procedure: Shoulder labral repair | 1.08 | 0.01 - 161.68 | 0.977 |
| Procedure: Cystectomy | 0 | 0 - Inf | 0.98 |
| Procedure: Nephrectomy | 0.37 | 0.09 - 1.45 | 0.154 |
| Procedure: Prostatectomy | 0.84 | 0.12 - 5.73 | 0.861 |
| Procedure: Hysterectomy | 0.37 | 0.11 - 1.26 | 0.114 |
| Procedure: Oophorectomy and salpingectomy | 0.38 | 0.04 - 3.49 | 0.392 |
| Procedure: Oophorectomy only | 0.95 | 0.09 - 10.18 | 0.963 |
| Procedure: Salpingectomy only | 0.44 | 0.04 - 4.68 | 0.5 |
| Clavien Dindo: None | Ref | | |
| Clavien Dindo: I-II | 1.93 | 1.17 - 3.18 | 0.013 |
| Clavien Dindo: III-IV | 2.91 | 0.88 - 9.64 | 0.081 |
| Discharge opioids: No | Ref | | |
| Discharge opioids: Yes | 2.38 | 1.36 - 4.17 | 0.004 |
| OMEs consumed 24h before discharge (per unit) | 1 | 1-1 | 0.156 |

ASA: American Association of Anaesthesiologists Grade, BMI: body mass index (kg/m^2), MIS: minimally invasive surgery. Mixed-effects model with country and hospital centre as random effects.

Table S10: Mixed-effects binary logistic regression model of factors associated with patients reporting ‘too little analgesia’ prescribed at 7 days

| Variable | Odds ratio | 95% CI | p-value |
|--|------------|-------------|---------|
| Intercept | 0.29 | 0.14 – 0.63 | 0.002 |
| Age (Years) | 0.99 | 0.99 – 1.00 | 0.096 |
| Sex: Female | Ref | | |
| Sex: Male | 0.8 | 0.66 – 0.97 | 0.023 |
| ASA I | Ref | | |
| ASA II-III | 1.12 | 0.90 – 1.38 | 0.313 |
| ASA IV-V | 2.66 | 1.27 – 5.54 | 0.009 |
| BMI: 20-24 | Ref | | |
| BMI: 25-30 | 1.11 | 0.91 – 1.37 | 0.301 |
| BMI: 31-40 | 1.23 | 0.97 – 1.56 | 0.091 |
| BMI: >40 | 1.35 | 0.89 – 2.06 | 0.161 |
| BMI: <18.5 | 1.63 | 0.90 – 2.97 | 0.11 |
| Smoking: Never | Ref | | |
| Smoking: Current | 1.22 | 0.96 – 1.55 | 0.101 |
| Smoking: Ex-smoker | 1.25 | 0.99 – 1.60 | 0.066 |
| Surgical approach: MIS | Ref | | |
| Surgical approach: Open | 0.87 | 0.69 – 1.09 | 0.215 |
| Indication: Benign | Ref | | |
| Indication: Malignancy | 0.76 | 0.52 – 1.09 | 0.136 |
| Urgency: Elective | Ref | | |
| Urgency: Emergency | 1.16 | 0.90 – 1.50 | 0.251 |
| Pre-surgery opioid use: No | Ref | | |
| Pre-surgery opioid use: Yes | 1.94 | 1.34 – 2.82 | <0.001 |
| Pre-surgery non-opioid analgesia use: No | Ref | | |

| | | | |
|---|------|--------------|--------|
| Pre-surgery non-opioid analgesia use: Yes | 1.09 | 0.89 – 1.34 | 0.412 |
| Procedure: Appendectomy | Ref | | |
| Procedure: Cholecystectomy | 0.79 | 0.58 – 1.08 | 0.139 |
| Procedure: Colorectal resection | 1.3 | 0.82 – 2.06 | 0.268 |
| Procedure: Inguinal hernia repair | 1.15 | 0.78 – 1.71 | 0.483 |
| Procedure: Nissen fundoplication | 1.21 | 0.46 – 3.16 | 0.696 |
| Procedure: Sleeve gastrectomy | 1.41 | 0.71 – 2.80 | 0.326 |
| Procedure: ACL repair | 2.83 | 1.53 – 5.24 | 0.001 |
| Procedure: Knee arthroplasty | 2.37 | 1.43 – 3.93 | 0.001 |
| Procedure: Hip arthroplasty | 1.63 | 0.95 – 2.78 | 0.076 |
| Procedure: Rotator cuff repair | 1.04 | 0.31 – 3.52 | 0.952 |
| Procedure: Shoulder arthroplasty | 4.39 | 1.50 – 12.91 | 0.007 |
| Procedure: Shoulder labral repair | 2.09 | 0.58 – 7.56 | 0.26 |
| Procedure: Cystectomy | 3.06 | 1.22 – 7.68 | 0.018 |
| Procedure: Nephrectomy | 1.47 | 0.76 – 2.85 | 0.258 |
| Procedure: Prostatectomy | 1.45 | 0.74 – 2.83 | 0.276 |
| Procedure: Hysterectomy | 0.9 | 0.56 – 1.47 | 0.685 |
| Procedure: Oophorectomy and salpingectomy | 1.53 | 0.68 – 3.47 | 0.307 |
| Procedure: Oophorectomy only | 1.35 | 0.45 – 4.02 | 0.595 |
| Procedure: Salpingectomy only | 0.83 | 0.35 – 1.93 | 0.658 |
| Clavien Dindo: None | Ref | | |
| Clavien Dindo: I-II | 1.41 | 1.13 – 1.76 | 0.003 |
| Clavien Dindo: III-IV | 1.28 | 0.55 – 2.99 | 0.572 |
| Discharge paracetamol: No | Ref | | |
| Discharge paracetamol: Yes | 0.65 | 0.52 – 0.81 | <0.001 |
| Discharge NSAIDs: No | Ref | | |

| | | | |
|---|------|-------------|--------|
| Discharge NSAIDs: Yes | 0.91 | 0.75 – 1.09 | 0.307 |
| Discharge opioids: No | Ref | | |
| Discharge opioids: Yes | 0.59 | 0.46 – 0.75 | <0.001 |
| OMEs consumed 24h before discharge (per unit) | 1 | 1-1 | 0.156 |

ASA: American Association of Anaesthesiologists Grade, BMI: body mass index (kg/m²), MIS: minimally invasive surgery. Mixed-effects model with country and hospital centre as random effects.

Table S11: Binary logistic regression model for risk of opioid prescription between HIC and LMIC

| Variable | Odds ratio | 95% CI | p-value |
|-----------------------------|------------|-------------|---------|
| Intercept | 2.16 | 1.36 - 3.43 | 0.002 |
| Age (Years) | 0.99 | 0.98 - 0.99 | 0 |
| Sex: Female | Ref | | |
| Sex: Male | 0.95 | 0.78 - 1.17 | 0.63 |
| ASA I | Ref | | |
| ASA II-III | 0.81 | 0.65 - 1.01 | 0.058 |
| ASA IV-V | 1.82 | 0.81 - 4.1 | 0.151 |
| BMI: 20-24 | Ref | | |
| BMI: 25-30 | 1.04 | 0.83 - 1.31 | 0.738 |
| BMI: 31-40 | 0.91 | 0.73 - 1.14 | 0.414 |
| BMI: >40 | 0.8 | 0.51 - 1.26 | 0.338 |
| BMI: <18.5 | 1.47 | 0.7 - 3.07 | 0.312 |
| Smoking: Never | Ref | | |
| Smoking: Current | 1.1 | 0.83 - 1.44 | 0.506 |
| Smoking: Ex-smoker | 0.76 | 0.62 - 0.94 | 0.011 |
| Surgical approach: MIS | Ref | | |
| Surgical approach: Open | 1.98 | 1.56 - 2.52 | 0 |
| Indication: Benign | Ref | | |
| Indication: Malignancy | 1.28 | 0.87 - 1.87 | 0.214 |
| Urgency: Elective | Ref | | |
| Urgency: Emergency | 0.62 | 0.48 - 0.79 | 0 |
| Pre-surgery opioid use: No | Ref | | |
| Pre-surgery opioid use: Yes | 0.83 | 0.61 - 1.13 | 0.249 |

| | | | |
|---|------|--------------|-------|
| Pre-surgery non-opioid analgesia use: No | Ref | | |
| Pre-surgery non-opioid analgesia use: Yes | 1.12 | 0.9 - 1.39 | 0.316 |
| Procedure: Appendectomy | Ref | | |
| Procedure: Cholecystectomy | 1.5 | 1.05 - 2.13 | 0.031 |
| Procedure: Colorectal resection | 0.76 | 0.48 - 1.21 | 0.246 |
| Procedure: Inguinal hernia repair | 1.1 | 0.72 - 1.67 | 0.656 |
| Procedure: Nissen fundoplication | 1.43 | 0.38 - 5.46 | 0.599 |
| Procedure: Sleeve gastrectomy | 1.5 | 0.7 - 3.22 | 0.304 |
| Procedure: ACL repair | 1.82 | 0.86 - 3.83 | 0.118 |
| Procedure: Knee arthroplasty | 0.93 | 0.55 - 1.59 | 0.793 |
| Procedure: Hip arthroplasty | 0.74 | 0.38 - 1.44 | 0.38 |
| Procedure: Rotator cuff repair | 1.06 | 0.35 - 3.26 | 0.918 |
| Procedure: Shoulder arthroplasty | 0.61 | 0.13 - 3 | 0.554 |
| Procedure: Shoulder labral repair | 2.32 | 0.17 - 31.49 | 0.527 |
| Procedure: Cystectomy | 0.55 | 0.14 - 2.18 | 0.395 |
| Procedure: Nephrectomy | 0.99 | 0.48 - 2.05 | 0.986 |
| Procedure: Prostatectomy | 0.74 | 0.38 - 1.46 | 0.393 |
| Procedure: Hysterectomy | 0.86 | 0.48 - 1.56 | 0.621 |
| Procedure: Oophorectomy and salpingectomy | 1.29 | 0.44 - 3.78 | 0.64 |
| Procedure: Oophorectomy only | 2.39 | 0.46 - 12.33 | 0.298 |
| Procedure: Salpingectomy only | 0.55 | 0.1 - 3.01 | 0.499 |
| Clavien Dindo: None | Ref | | |
| Clavien Dindo: I-II | 0.89 | 0.71 - 1.12 | 0.324 |
| Clavien Dindo: III-IV | 1.12 | 0.53 - 2.36 | 0.769 |
| OMEs consumed 24h before discharge (per unit) | 1 | 1-Jan | 0 |
| LMIC | Ref | | |

| | | | |
|-----|-----|----------|---|
| HIC | 9.1 | 7.7-11.1 | 0 |
|-----|-----|----------|---|

ASA: American Association of Anaesthesiologists Grade, BMI: body mass index (kg/m²), MIS: minimally invasive surgery, LMIC: Low- and middle- income country, HIC: High income country. Mixed-effects model with country and hospital centre as random effects.

Table S12: Variations in demographics by region

| Variable | | East Asia & Oceania | Europe & Central Asia | Latin America & Caribbean | Middle East & North Africa | North America | South Asia | Sub-Saharan Africa | Total | p |
|--------------------|----------------------|---------------------|-----------------------|---------------------------|----------------------------|---------------------|---------------------|---------------------|---------------------|--------|
| Total N (%) | | 1400 (32.8) | 935 (21.9) | 21 (0.5) | 1535 (35.9) | 28 (0.7) | 136 (3.2) | 218 (5.1) | 4273 | |
| Age | Median (IQR) | 55.0 (37.0 to 68.0) | 60.0 (47.0 to 70.0) | 41.0 (31.0 to 55.0) | 42.0 (30.0 to 56.0) | 53.5 (41.5 to 62.2) | 40.0 (30.0 to 52.2) | 42.0 (32.0 to 54.0) | 50.0 (34.0 to 64.0) | <0.001 |
| Sex | Female | 745 (53.2) | 391 (41.8) | 13 (61.9) | 894 (58.2) | 18 (64.3) | 76 (55.9) | 134 (61.5) | 2271 (53.1) | <0.001 |
| | Male | 652 (46.6) | 544 (58.2) | 8 (38.1) | 641 (41.8) | 10 (35.7) | 60 (44.1) | 84 (38.5) | 1999 (46.8) | |
| | Other | 3 (0.2) | | | | | | | 3 (0.1) | |
| ASA | I | 361 (25.8) | 229 (24.5) | 8 (38.1) | 937 (61.0) | 0 (0.0) | 87 (64.0) | 141 (64.7) | 1763 (41.3) | <0.001 |
| | II-III | 1023 (73.1) | 704 (75.3) | 13 (61.9) | 580 (37.8) | 28 (100.0) | 47 (34.6) | 71 (32.6) | 2466 (57.7) | |
| | IV - V | 13 (0.9) | 2 (0.2) | 0 (0.0) | 16 (1.0) | 0 (0.0) | 2 (1.5) | 6 (2.8) | 39 (0.9) | |
| | (Missing) | 3 (0.2) | 0 (0.0) | 0 (0.0) | 2 (0.1) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 5 (0.1) | |
| BMI | Normal (18.5 - 24.9) | 318 (22.7) | 275 (29.4) | 9 (42.9) | 406 (26.4) | 5 (17.9) | 51 (37.5) | 98 (45.0) | 1162 (27.2) | <0.001 |
| | Overweight (25-30) | 389 (27.8) | 408 (43.6) | 7 (33.3) | 553 (36.0) | 7 (25.0) | 47 (34.6) | 52 (23.9) | 1463 (34.2) | |
| | Obese (31-40) | 372 (26.6) | 153 (16.4) | 5 (23.8) | 341 (22.2) | 14 (50.0) | 29 (21.3) | 22 (10.1) | 936 (21.9) | |
| | Severely obese (>40) | 115 (8.2) | 27 (2.9) | 0 (0.0) | 55 (3.6) | 2 (7.1) | 4 (2.9) | 2 (0.9) | 205 (4.8) | |
| | Underweight (< 18.5) | 13 (0.9) | 19 (2.0) | 0 (0.0) | 27 (1.8) | 0 (0.0) | 4 (2.9) | 6 (2.8) | 69 (1.6) | |
| | (Missing) | 193 (13.8) | 53 (5.7) | 0 (0.0) | 153 (10.0) | 0 (0.0) | 1 (0.7) | 38 (17.4) | 438 (10.3) | |
| MI or CHF | No | 1313 (93.8) | 857 (91.7) | 21 (100.0) | 1472 (95.9) | 25 (89.3) | 131 (96.3) | 216 (99.1) | 4035 (94.4) | <0.001 |
| | Yes | 87 (6.2) | 78 (8.3) | | 63 (4.1) | 3 (10.7) | 5 (3.7) | 2 (0.9) | 238 (5.6) | |

| | | | | | | | | | | |
|-----------------|----------------|-------------|------------|------------|-------------|------------|-------------|------------|-------------|--------|
| PVD | No | 1379 (98.5) | 908 (97.1) | 21 (100.0) | 1470 (95.8) | 28 (100.0) | 130 (95.6) | 217 (99.5) | 4153 (97.2) | <0.001 |
| | Yes | 21 (1.5) | 27 (2.9) | | 65 (4.2) | | 6 (4.4) | 1 (0.5) | 120 (2.8) | |
| CVA or TIA | No | 1362 (97.3) | 910 (97.3) | 21 (100.0) | 1515 (98.7) | 27 (96.4) | 136 (100.0) | 217 (99.5) | 4188 (98.0) | 0.014 |
| | Yes | 38 (2.7) | 25 (2.7) | | 20 (1.3) | 1 (3.6) | | 1 (0.5) | 85 (2.0) | |
| PUD | No | 1390 (99.3) | 917 (98.1) | 20 (95.2) | 1491 (97.1) | 27 (96.4) | 135 (99.3) | 205 (94.0) | 4185 (97.9) | <0.001 |
| | Yes | 10 (0.7) | 18 (1.9) | 1 (4.8) | 44 (2.9) | 1 (3.6) | 1 (0.7) | 13 (6.0) | 88 (2.1) | |
| Diabetes | No | 1243 (88.8) | 786 (84.1) | 19 (90.5) | 1288 (83.9) | 25 (89.3) | 110 (80.9) | 203 (93.1) | 3674 (86.0) | <0.001 |
| | Yes | 157 (11.2) | 149 (15.9) | 2 (9.5) | 247 (16.1) | 3 (10.7) | 26 (19.1) | 15 (6.9) | 599 (14.0) | |
| CKD | No | 1346 (96.1) | 919 (98.3) | 21 (100.0) | 1517 (98.8) | 26 (92.9) | 135 (99.3) | 217 (99.5) | 4181 (97.8) | <0.001 |
| | Yes | 54 (3.9) | 16 (1.7) | | 18 (1.2) | 2 (7.1) | 1 (0.7) | 1 (0.5) | 92 (2.2) | |
| Liver disease | No | 1364 (97.4) | 913 (97.6) | 21 (100.0) | 1517 (98.8) | 28 (100.0) | 134 (98.5) | 216 (99.1) | 4193 (98.1) | 0.085 |
| | Yes | 36 (2.6) | 22 (2.4) | | 18 (1.2) | | 2 (1.5) | 2 (0.9) | 80 (1.9) | |
| Comorbid Cancer | No | 1211 (86.5) | 820 (87.7) | 21 (100.0) | 1484 (96.7) | 25 (89.3) | 136 (100.0) | 205 (94.0) | 3902 (91.3) | <0.001 |
| | Yes | 189 (13.5) | 115 (12.3) | | 51 (3.3) | 3 (10.7) | | 13 (6.0) | 371 (8.7) | |
| Smoking | Never smoked | 740 (52.9) | 455 (48.7) | 13 (61.9) | 1048 (68.3) | 18 (64.3) | 115 (84.6) | 175 (80.3) | 2564 (60.0) | <0.001 |
| | Current smoker | 153 (10.9) | 253 (27.1) | 3 (14.3) | 298 (19.4) | 2 (7.1) | 13 (9.6) | 10 (4.6) | 732 (17.1) | |
| | Ex-smoker | 364 (26.0) | 155 (16.6) | 2 (9.5) | 117 (7.6) | 8 (28.6) | 3 (2.2) | 13 (6.0) | 662 (15.5) | |
| | (Missing) | 143 (10.2) | 72 (7.7) | 3 (14.3) | 72 (4.7) | 0 (0.0) | 5 (3.7) | 20 (9.2) | 315 (7.4) | |
| Procedure | Appendectomy | 327 (23.4) | 124 (13.3) | 3 (14.3) | 269 (17.5) | 6 (21.4) | 11 (8.1) | 23 (10.6) | 763 (17.9) | <0.001 |

| | | | | | | | | | | |
|--|--------------------------------|------------|------------|----------|------------|-----------|-----------|-----------|-------------|--|
| | Cholecystectomy | 384 (27.4) | 232 (24.8) | 9 (42.9) | 477 (31.1) | 17 (60.7) | 47 (34.6) | 60 (27.5) | 1226 (28.7) | |
| | Colorectal resection | 152 (10.9) | 163 (17.4) | 0 (0.0) | 67 (4.4) | 3 (10.7) | 0 (0.0) | 8 (3.7) | 393 (9.2) | |
| | Inguinal hernia repair | 113 (8.1) | 222 (23.7) | 0 (0.0) | 171 (11.1) | 2 (7.1) | 41 (30.1) | 27 (12.4) | 576 (13.5) | |
| | Nissen fundoplication | 8 (0.6) | 7 (0.7) | 0 (0.0) | 12 (0.8) | 0 (0.0) | 0 (0.0) | 1 (0.5) | 28 (0.7) | |
| | Sleeve gastrectomy | 19 (1.4) | 14 (1.5) | 0 (0.0) | 37 (2.4) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 70 (1.6) | |
| | ACL repair | 14 (1.0) | 3 (0.3) | 2 (9.5) | 58 (3.8) | 0 (0.0) | 0 (0.0) | 1 (0.5) | 78 (1.8) | |
| | Knee arthroplasty | 115 (8.2) | 43 (4.6) | 4 (19.0) | 87 (5.7) | 0 (0.0) | 7 (5.1) | 1 (0.5) | 257 (6.0) | |
| | Hip arthroplasty | 89 (6.4) | 46 (4.9) | 2 (9.5) | 44 (2.9) | 0 (0.0) | 0 (0.0) | 20 (9.2) | 201 (4.7) | |
| | Rotator cuff repair | 2 (0.1) | 9 (1.0) | 1 (4.8) | 8 (0.5) | 0 (0.0) | 0 (0.0) | 2 (0.9) | 22 (0.5) | |
| | Shoulder arthroplasty | 10 (0.7) | 0 (0.0) | 0 (0.0) | 10 (0.7) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 20 (0.5) | |
| | Shoulder labral repair | 0 (0.0) | 1 (0.1) | 0 (0.0) | 12 (0.8) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 13 (0.3) | |
| | Cystectomy | 8 (0.6) | 4 (0.4) | 0 (0.0) | 14 (0.9) | 0 (0.0) | 0 (0.0) | 6 (2.8) | 32 (0.7) | |
| | Nephrectomy | 38 (2.7) | 22 (2.4) | 0 (0.0) | 32 (2.1) | 0 (0.0) | 4 (2.9) | 4 (1.8) | 100 (2.3) | |
| | Prostatectomy | 46 (3.3) | 18 (1.9) | 0 (0.0) | 29 (1.9) | 0 (0.0) | 0 (0.0) | 8 (3.7) | 101 (2.4) | |
| | Hysterectomy | 53 (3.8) | 21 (2.2) | 0 (0.0) | 152 (9.9) | 0 (0.0) | 14 (10.3) | 47 (21.6) | 287 (6.7) | |
| | Oophorectomy and Salpingectomy | 13 (0.9) | 4 (0.4) | 0 (0.0) | 17 (1.1) | 0 (0.0) | 4 (2.9) | 3 (1.4) | 41 (1.0) | |
| | Oophorectomy only | 2 (0.1) | 0 (0.0) | 0 (0.0) | 14 (0.9) | 0 (0.0) | 7 (5.1) | 1 (0.5) | 24 (0.6) | |
| | Salpingectomy | 7 (0.5) | 2 (0.2) | 0 (0.0) | 25 (1.6) | 0 (0.0) | 1 (0.7) | 6 (2.8) | 41 (1.0) | |

| | | | | | | | | | | |
|--------------------------------------|--------------|-----------------------|----------------------|----------------------|----------------------|-----------------------|----------------------|----------------------|----------------------|--------|
| | only | | | | | | | | | |
| Surgical approach | MIS | 1012 (72.3) | 455 (48.7) | 17 (81.0) | 694 (45.2) | 23 (82.1) | 66 (48.5) | 34 (15.6) | 2301 (53.8) | <0.001 |
| | Open | 388 (27.7) | 480 (51.3) | 4 (19.0) | 839 (54.7) | 5 (17.9) | 70 (51.5) | 184 (84.4) | 1970 (46.1) | |
| | (Missing) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 2 (0.1) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 2 (0.0) | |
| Indication | Benign | 1220 (87.1) | 755 (80.7) | 20 (95.2) | 1407 (91.7) | 26 (92.9) | 131 (96.3) | 186 (85.3) | 3745 (87.6) | <0.001 |
| | Malignancy | 180 (12.9) | 180 (19.3) | 1 (4.8) | 127 (8.3) | 2 (7.1) | 5 (3.7) | 32 (14.7) | 527 (12.3) | |
| | (Missing) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 1 (0.1) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 1 (0.0) | |
| Urgency | Elective | 765 (54.6) | 678 (72.5) | 9 (42.9) | 1166 (76.0) | 7 (25.0) | 122 (89.7) | 169 (77.5) | 2916 (68.2) | <0.001 |
| | Emergency | 634 (45.3) | 257 (27.5) | 12 (57.1) | 369 (24.0) | 21 (75.0) | 14 (10.3) | 49 (22.5) | 1356 (31.7) | |
| | (Missing) | 1 (0.1) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 1 (0.0) | |
| Surgical duration | Median (IQR) | 100.0 (71.0 to 140.0) | 85.0 (56.0 to 120.0) | 60.0 (45.0 to 165.0) | 70.0 (50.0 to 110.0) | 114.5 (85.5 to 132.5) | 45.0 (35.0 to 120.0) | 90.0 (50.0 to 120.0) | 87.0 (60.0 to 120.0) | <0.001 |
| Opioid use pre-surgery | No | 1259 (89.9) | 917 (98.1) | 19 (90.5) | 1515 (98.7) | 27 (96.4) | 135 (99.3) | 217 (99.5) | 4089 (95.7) | <0.001 |
| | Yes | 141 (10.1) | 18 (1.9) | 2 (9.5) | 20 (1.3) | 1 (3.6) | 1 (0.7) | 1 (0.5) | 184 (4.3) | |
| Non-opioid analgesia use pre-surgery | No | 1049 (74.9) | 816 (87.3) | 15 (71.4) | 1134 (73.9) | 24 (85.7) | 117 (86.0) | 174 (79.8) | 3329 (77.9) | <0.001 |
| | Yes | 351 (25.1) | 119 (12.7) | 6 (28.6) | 401 (26.1) | 4 (14.3) | 19 (14.0) | 44 (20.2) | 944 (22.1) | |
| Clavien Dindo complication | None | 1097 (78.4) | 745 (79.7) | 16 (76.2) | 1274 (83.0) | 28 (100.0) | 127 (93.4) | 188 (86.2) | 3475 (81.3) | <0.001 |
| | I-II | 277 (19.8) | 176 (18.8) | 5 (23.8) | 256 (16.7) | 0 (0.0) | 8 (5.9) | 30 (13.8) | 752 (17.6) | |
| | III-IV | 23 (1.6) | 14 (1.5) | 0 (0.0) | 3 (0.2) | 0 (0.0) | 1 (0.7) | 0 (0.0) | 41 (1.0) | |
| | (Missing) | 3 (0.2) | 0 (0.0) | 0 (0.0) | 2 (0.1) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 5 (0.1) | |
| Length of | Median (IQR) | 2.0 (1.0 to | 3.0 (1.0 to | 1.0 (0.0 to 1.0) | 1.0 (1.0 to 2.0) | 0.0 (0.0 to 1.0) | 2.0 (1.0 to | 3.0 (2.0 to | 2.0 (1.0 to | <0.001 |

| | | | | | | | | | | |
|------------------------------------|--------------|--------------------|------------------|---------------------|-------------------|--------------------|-------------------|--------------------|-------------------|--------|
| Stay | | 3.0) | 6.0) | | | | 3.0) | 5.0) | 3.0) | |
| Paracetamol on discharge | No | 152 (10.9) | 276 (29.5) | 0 (0.0) | 424 (27.6) | 3 (10.7) | 68 (50.0) | 63 (28.9) | 986 (23.1) | <0.001 |
| | Yes | 1247 (89.1) | 659 (70.5) | 21 (100.0) | 1110 (72.3) | 25 (89.3) | 68 (50.0) | 155 (71.1) | 3285 (76.9) | |
| | (Missing) | 1 (0.1) | 0 (0.0) | 0 (0.0) | 1 (0.1) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 2 (0.0) | |
| NSAIDs on discharge | No | 788 (56.3) | 592 (63.3) | 9 (42.9) | 688 (44.8) | 13 (46.4) | 21 (15.4) | 78 (35.8) | 2189 (51.2) | <0.001 |
| | Yes | 610 (43.6) | 343 (36.7) | 12 (57.1) | 846 (55.1) | 15 (53.6) | 115 (84.6) | 140 (64.2) | 2081 (48.7) | |
| | (Missing) | 2 (0.1) | 0 (0.0) | 0 (0.0) | 1 (0.1) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 3 (0.1) | |
| OMEs consumed 24h before discharge | Median (IQR) | 22.5 (0.0 to 50.0) | 0.0 (0.0 to 0.0) | 20.0 (10.0 to 20.0) | 2.0 (0.0 to 40.0) | 14.2 (8.6 to 24.8) | 9.0 (9.0 to 20.0) | 0.0 (0.0 to 150.0) | 9.0 (0.0 to 40.0) | <0.001 |

ASA: American Association of Anaesthesiologists Grade, BMI: body mass index (kg/m²), MIS: minimally invasive surgery, MI: myocardial infarction history, CHF: congestive heart failure, PVD: peripheral vascular disease, CVA: cerebrovascular accident, TIA: transient ischaemic attack, PUD: peptic ulcer disease, CKD: chronic kidney disease, ACL: Anterior cruciate ligament, NSAID: Non-steroidal anti-inflammatory drug, OME: Oral morphine equivalents.

Table S13: Patient reported outcomes by geographical region

| Variable | | East Asia & Pacific | Europe & Central Asia | Latin America & Caribbean | Middle East & North Africa | North America | South Asia | Sub-Saharan Africa | Total | p |
|--|--------------|---------------------|-----------------------|---------------------------|----------------------------|---------------------|----------------------|----------------------|---------------------|--------|
| Total N (%) | | 1400 (32.8) | 935 (21.9) | 21 (0.5) | 1535 (35.9) | 28 (0.7) | 136 (3.2) | 218 (5.1) | 4273 | |
| Percent time in severe pain in week post-discharge (%) | Median (IQR) | 15.0 (0.0 to 40.0) | 10.0 (0.0 to 20.0) | 10.0 (10.0 to 30.0) | 15.0 (5.0 to 35.0) | 10.0 (0.0 to 26.2) | 2.5 (0.0 to 11.2) | 11.5 (2.0 to 30.0) | 10.0 (1.0 to 30.0) | <0.001 |
| Post-discharge medical presentation for pain | No | 1197 (85.5) | 902 (96.5) | 19 (90.5) | 1344 (87.6) | 25 (89.3) | 131 (96.3) | 204 (93.6) | 3822 (89.4) | <0.001 |
| | Yes | 203 (14.5) | 33 (3.5) | 2 (9.5) | 191 (12.4) | 3 (10.7) | 5 (3.7) | 14 (6.4) | 451 (10.6) | |
| Post-discharge medical presentation for medication SEs | No | 1331 (95.1) | 916 (98.0) | 20 (95.2) | 1435 (93.5) | 25 (89.3) | 133 (97.8) | 211 (96.8) | 4071 (95.3) | <0.001 |
| | Yes | 69 (4.9) | 19 (2.0) | 1 (4.8) | 100 (6.5) | 3 (10.7) | 3 (2.2) | 7 (3.2) | 202 (4.7) | |
| Satisfaction with pain treatment (0-10) | Median (IQR) | 9.0 (8.0 to 10.0) | 9.0 (8.0 to 10.0) | 10.0 (9.0 to 10.0) | 8.0 (7.0 to 9.0) | 9.0 (8.0 to 10.0) | 9.0 (8.0 to 10.0) | 9.0 (8.0 to 10.0) | 9.0 (8.0 to 10.0) | <0.001 |
| Satisfaction amount of analgesia provided | Too little | 278 (19.9) | 119 (12.7) | 1 (4.8) | 373 (24.3) | 2 (7.1) | 29 (21.3) | 49 (22.5) | 851 (19.9) | <0.001 |
| | Just right | 924 (66.0) | 774 (82.8) | 18 (85.7) | 1118 (72.8) | 18 (64.3) | 102 (75.0) | 159 (72.9) | 3113 (72.9) | |
| | Too much | 196 (14.0) | 42 (4.5) | 2 (9.5) | 41 (2.7) | 8 (28.6) | 5 (3.7) | 10 (4.6) | 304 (7.1) | |
| | (Missing) | 2 (0.1) | 0 (0.0) | 0 (0.0) | 3 (0.2) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 5 (0.1) | |
| EQ-5D-5L composite score (0-100) | Median (IQR) | 80.9 (69.5 to 88.7) | 93.7 (81.3 to 100.0) | 80.9 (70.1 to 84.0) | 83.8 (73.9 to 93.7) | 83.3 (73.2 to 88.8) | 93.7 (76.1 to 100.0) | 88.7 (77.9 to 100.0) | 85.9 (73.8 to 93.7) | <0.001 |
| EQ-VAS score (0-100) | Median (IQR) | 75.0 (60.0 to 85.0) | 90.0 (75.0 to 95.0) | 90.0 (80.0 to 95.0) | 80.0 (70.0 to 90.0) | 75.0 (70.0 to 85.0) | 90.0 (80.0 to 98.0) | 90.0 (75.0 to 95.0) | 80.0 (70.0 to 90.0) | <0.001 |

Appendix S1: Study protocol

Opioid PrEscRiptions and usage After Surgery (OPERAS): protocol for a prospective multicentre observational cohort study of opioid use after surgery. *BMJ Open* 2022;12:e063577. doi: 10.1136/bmjopen-2022-063577

Appendix S2: Phone follow up script



OPERAS FOLLOW-UP SCRIPT VERSION 4.0 | 28/02/22

OPERAS Follow-up telephone interview script:

Good afternoon/morning/evening Mr/Mrs/title (as listed on file) participant's name.

My name is _____, and I am a _____ (e.g., researcher medical student or role as appropriate) and I am calling on behalf of the OPERAS study team. You may remember we discussed a study about medicine prescriptions for pain relief after surgery while you were in hospital 1 week ago. Is now a good time to talk?

Before we start, can I confirm you're still happy to participate in this study?

If yes, start questionnaire, if no, thank participant and end call. Record participant as withdrawn from study at their request

We will start by asking a series of questions about the medicines you have used to help with pain after your return home from hospital

Can I ask if you have used **any** medicines for pain since you left hospital?

If Yes, ask questions 1 – 11. If No, go to question 12 and continue from there.

1. Did you take your hospital-prescribed opioid pain-relief medications? (give examples of prescribed medications here e.g. sevredol). If answer no, go to Qu 8. If yes, ask Qu 2 and on
2. How many tablets of _____ did you take through the course of the week? (Please go through the list of medications this patient was prescribed and calculate the quantity consumed in number of tablets OR mls)
3. Were you prescribed any other opioid medications I have missed?
(Take this opportunity to answer any questions about what medications may or may not count as opioids – this study includes weak opioids such as tramadol and codeine).
4. What was the date you last consumed your opioid medication?
5. While you have been at home, have you had any of the following side-effects?
Nausea or vomiting
Drowsiness
Itching
Dizziness
Constipation
 - a. If they said yes to any of the above, ask them: can you please describe on a scale of 0 to 10, 0 being none at all and 10 being extreme, how severe these side effects were?

6. Were you prescribed any laxatives, that is medications to help pass bowel motions easier, or anti-sickness medications? (You may use cyclizine, metoclopramide, ondansetron or appropriate anti-emetics as examples to give examples to the patient, lactulose, coloxyl, senna are examples of laxatives).
7. Did you receive information, advice or education on how to dispose of excess opioid medications?

For all patients:

8. Did you use paracetamol/panadol to manage pain during the last week?
9. Did you use any non-steroidals like ibuprofen, naproxen, or celecoxib (insert common trade names i.e. nurofen to help with pain in the last week)?
10. Did you use any nerve pain medications like gabapentin, pregabalin, or amitriptyline to help with pain in the last week?
11. Did you seek medical help for pain relief? This includes your GP, urgent care or the emergency department, the ward you were in at the hospital, or your surgeon.
 - a. If Yes, did you receive any additional medicines?
 - b. If yes, were they the same dose, higher dose, or lower dose? (You may ask the patient to check their containers or prescription to compare).
12. Did you get any pain relief medications from any other sources? For example, from friends or family, or that you already had at home? Anything you tell us here will not be passed on to anyone else, and we do not want to know anyone's name.
 - a. If yes, do you know the name, dose and how many you have used?
13. Did you seek any medical help for side effects from your pain medication? If so, was this the GP, urgent care, the emergency department, the ward you were in at the hospital, or your surgeon.? (Clarify if they were readmitted).
14. For the past 3 months prior to your admission, were you using any routine pain killer medications?
 - a. If yes, how many days per week?
 - b. If yes, what medications were you using (tick boxes which apply)?

The next series of questions will ask you about your quality of life after surgery.

15. We are trying to find out what you think about your health. I will explain what to do as I go along, but please interrupt me if you do not understand something or if things are not clear to you. There are no right or wrong answers. We are interested only in your personal view.
16. First, I am going to read out some questions. Each question has a choice of five answers. Please tell me which answer best describes your health TODAY.

17. Do not choose more than one answer in each group of questions. (Note to interviewer: first read all five options for each question. Then ask the respondent to choose which one applies to him/herself. Repeat the question and options if necessary. Mark the appropriate box under each heading. You may need to remind the respondent regularly that the timeframe is TODAY)

EQ-5D DESCRIPTIVE SYSTEM

19. First, I would like to ask you about MOBILITY. Would you say that:
1. You have no problems in walking about?
 2. You have slight problems in walking about?
 3. You have moderate problems in walking about?
 4. You have severe problems in walking about?
 5. You are unable to walk about?
20. Next, I would like to ask you about SELF-CARE. Would you say that:
1. You have no problems washing or dressing yourself?
 2. You have slight problems washing or dressing yourself?
 3. You have moderate problems washing or dressing yourself?
 4. You have severe problems washing or dressing yourself?
 5. You are unable to wash or dress yourself?
21. Next, I would like to ask you about USUAL ACTIVITIES, for example work, study, housework, family or leisure activities. Would you say that:
1. You have no problems doing your usual activities?
 2. You have slight problems doing your usual activities?
 3. You have moderate problems doing your usual activities?
 4. You have severe problems doing your usual activities?
 5. You are unable to do your usual activities?
22. Next, I would like to ask you about PAIN OR DISCOMFORT. Would you say that:
1. You have no pain or discomfort?
 2. You have slight pain or discomfort?
 3. You have moderate pain or discomfort?
 4. You have severe pain or discomfort?
 5. You have extreme pain or discomfort?
23. The next question we would like to ask is regarding your mental health and wellbeing and may be sensitive. Is this okay to discuss?
- If prompted for the reason for the question: we are asking this question to get a holistic perspective of your overall health, including mental health and mood to investigate whether opioids impact on these aspects of your life. If yes: go to Q24, if no go to Q25
24. Finally, I would like to ask you about ANXIETY OR DEPRESSION. Would you say that:
1. You are not anxious or depressed?

2. You are slightly anxious or depressed?
3. You are moderately anxious or depressed?
4. You are severely anxious or depressed?
5. You are extremely anxious or depressed?

EQ-5D VAS

25. Now, I would like to ask you to say how good or bad your health is TODAY. I would like you to picture in your mind a vertical line that is numbered from 0 to 100. (Note to interviewer: if interviewing face-to-face, please show the respondent the VAS line.)

- a. "100 at the top of the line means the best health you can imagine.
- b. 0 at the bottom of the line means the worst health you can imagine."

26. I would now like you to tell me the point on this line where you would put your health TODAY. (Note to interviewer: mark the line at the point indicating the respondent's health today)

The next questions are about what has happened to you since you left hospital one week ago

27. On a scale of 0 to 100, 0 being none of the time and 100 being all of the time, how often were you in **severe** pain in the last week?

28. Did you remember receiving any information, advice, or education about managing your pain from your doctor or nurse before being discharged from hospital?
Yes/No/Can't recall

29. In your opinion, was the amount of pain medication you received when leaving hospital too little, just right or too much to manage your pain during this week?

30. On a scale of 0 to 10, 0 being extremely dissatisfied and 10 being extremely satisfied, how satisfied were you with the results of your pain treatment over the past week?

Thank you for your time. Do you have any questions?

If anything we have discussed has brought up any bad feelings and you'd like to talk to someone further, I can recommend some resources for you.

For Australia: Lifeline Australia 13 11 14, for Aotearoa New Zealand: Lifeline Aotearoa 0508 828 865

Appendix S3: OPERAS Opioid prescription and consumption calculations

OPERAS Opioid Calculations

The following values were calculated for OPERAS data analysis.

- A. Opioid consumption in 24 hours prior to discharge (as oral morphine equivalents (OME))
- B. Total quantity of opioids prescribed on discharge (as OME)
- C. Opioid consumption in 7 days after discharge (as OME)

A. Opioid consumption in 24 hours prior to discharge (as OME)

Calculation: For each opioid: Total quantity consumed (mg/mcg) x relevant conversion factor (depending on opioid type and route of administration, see **Table 1**) = OME for that opioid. Sum of all individual OMEs = total opioid consumption in 24 hours prior to discharge (as OME).

B. Total quantity of opioids prescribed on discharge (as OME)

Calculation: For each opioid: Total quantity of medication prescribed (number of tablets/ patches/ injections/ volume of liquid) x dose (mg/mcg) x relevant conversion factor = OME for that opioid. Sum of all OMEs = total opioid prescription at discharge (as OME).

C. Opioid consumption in 7 days after discharge (as OME)

Calculation: For each opioid: Total quantity of medication consumed (number of tablets/ patches/ injections/ volume of liquid) x dose (mg/mcg) x relevant conversion factor = OME for that opioid. Sum of all OMEs = total opioid consumption in 24 hours prior to discharge (as OME).

Oral Morphine Equivalent (OME) Calculation

In order to calculate the OME for a given opioid, the opioid dose is multiplied by the relevant conversion factor (listed in Table 1).

For example, oral oxycodone can be converted to oral morphine using a conversion factor of 1.5. Therefore, the OME of oxycodone 5mg is $5 \times 1.5 = 7.5\text{mg}$.

OMEs with corresponding ANZCA FPM conversion factors were integrated with the REDCap data collection tool. Other OMEs were calculated using R.

Opioid combination products such as Oxycodone/ Naloxone were coded according to the opioid component.

Table 1: Opioid Oral Morphine Equivalent Conversion Factors used in OPERAS and corresponding source.

| Opioid | Route | Conversion factor | Source |
|----------------------------|---------------------|-------------------|----------------------------------|
| Morphine (mg) | PO (tablet/ liquid) | 1 | ANZCA FPM ¹ |
| | SC/ IM/ IV | 3 | ANZCA FPM ¹ |
| Tramadol (mg) | PO (tablet/ liquid) | 0.2 | ANZCA FPM ¹ |
| | SC/ IM/ IV | 0.4 | NHS ⁴ |
| Oxycodone (mg) | PO (tablet/ liquid) | 1.5 | ANZCA FPM ¹ |
| | SC/ IM/ IV | 3 | ANZCA FPM ¹ |
| Fentanyl (mcg) | PO (tablet/ liquid) | 0.33 | Arnold & Weissman ⁷ |
| | TD (patch) | 3 | ANZCA FPM ¹ |
| | SC/ IM/ IV | 0.2 | ANZCA FPM ¹ |
| Codeine (mg) | PO (tablet/ liquid) | 0.13 | ANZCA FPM ¹ |
| | SC/ IM/ IV | 0.25 | ANZCA FPM ¹ |
| Buprenorphine (mcg) | Sublingual | 0.04 | ANZCA FPM ¹ |
| | TD (patch) | 2 | ANZCA FPM ¹ |
| | IM/ IV | 0.075 | Nielsen et al. 2014 ² |
| Pethidine (mg) | PO (tablet/ liquid) | 0.125 | NHS ⁴ |

| | | | |
|---------------------------------|---------------------|------|--|
| | SC/ IM/ IV | 0.4 | ANZCA FPM ¹ |
| Hydromorphone (mg) | PO (tablet/ liquid) | 5 | ANZCA FPM ¹ |
| | SC/ IM/ IV | 15 | ANZCA FPM ¹ |
| Tapentadol (mg) | PO (tablet/ liquid) | 0.3 | ANZCA FPM ¹ |
| Dextro-propoxyphene (mg) | PO (tablet/ liquid) | 0.1 | ANZCA FPM ¹ |
| Pentazocine | Oral | 0.16 | Stoelting's Pharmacology & Physiology ⁶ |
| | SC/ IM/ IV | 2.5 | Stoelting's Pharmacology & Physiology ⁶ |
| Nalbuphine | IV | 3 | UNC ⁵ |
| Alfentanil (mg) | IV | 35 | NHS ⁴ |
| Remifentanil (mg) | IV | 33 | Arnold & Weissman ⁷ |
| Butorphanol | IV | 15 | UNC ⁵ |
| Hydrocodone | PO | 1 | UpToDate ³ |

References

1. [https://www.anzca.edu.au/getattachment/6892fb13-47fc-446b-a7a2-11cdf1c9902/PS01\(PM\)-\(Appendix\)-Opioid-Dose-Equivalence-Calculation-Table](https://www.anzca.edu.au/getattachment/6892fb13-47fc-446b-a7a2-11cdf1c9902/PS01(PM)-(Appendix)-Opioid-Dose-Equivalence-Calculation-Table)
2. <https://ndarc.med.unsw.edu.au/sites/default/files/ndarc/resources/TR.329.pdf>
3. <https://www.uptodate.com/contents/image?imageKey=PALC%2F111216>
4. <https://www.gloshospitals.nhs.uk/gps/treatment-guidelines/opioid-equivalence-chart/>
5. <https://www.med.unc.edu/aging/wp-content/uploads/sites/753/2018/06/Analgesic-Equivalent-Chart.pdf>
6. https://www.bookdepository.com/Stoelting-Pharmacology-and-Physiology-in-Anesthetic-Practice-Pamela-Flood/9781975126896?redirected=true&utm_medium=Google&utm_campaign=Base3&

[utm_source=NZ&utm_content=Stoeltings-Pharmacology-and-Physiology-in-Anesthetic-Practice&selectCurrency=NZD&w=AF7CAU96V07FPHA8VTLM&qclid=EAlaIQobChMlvObWw62J-AIVzpJmAh1HVQvzEAQYBSABEqJxAfD_BwE](#)

7. Arnold R, Weissman DE. Calculating Opioid Dose Conversions, 2nd Edition. Fast Facts and Concepts. July 2005; 36.

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