Ballock RT, Seif J, Goodwin R, Lin JH, Cirillo J. Clinical and economic outcomes associated with use of liposomal bupivacaine versus standard of care for management of postsurgical pain in pediatric patients undergoing spine surgery. *JHEOR*. 2021;8(1):29-35. doi:10.36469/jheor.2021.21967

**Supplemental Table 1. Surgical Procedure Codes**

**Supplemental Table 2. Definition Codes for Liposomal Bupivacaine Analgesia**

**Supplemental Table 3. Conversion Factors for In-Hospital Postsurgical Opioid Consumption in Morphine Equivalents**

**Supplemental Table 4. Unadjusted In-hospital Postsurgical Opioid Consumption Outcome After Primary Spine Surgery in Pediatric Patients**

**Supplemental Table 5. Unadjusted Opioid-Related Adverse Event Outcomes After Primary Spine Surgery in Pediatric Patients**

**Supplemental Table 6. Unadjusted Economic Outcomes After Primary Spine Surgery in Pediatric Patients**

This supplementary material has been provided by the authors to give readers additional information about their work.

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### Supplemental Table 2. Definition Codes for Liposomal Bupivacaine Analgesia

| Standard Charge Code | Standard Charge Description | Hospital Charge ID | Hospital Charge Description |
|----------------------|----------------------------|--------------------|----------------------------|
| 2502501118500000     | BUPIVACAINE, EXPAREL VL 13.3MG/ML (1.3%) 10ML | 17540273           | 65250-0133-09 - BUPIVACAINE LIPOSOME 1.3 |
| 2502501118500000     | BUPIVACAINE, EXPAREL VL 13.3MG/ML (1.3%) 10ML | 19957138           | 65250-0133-09 - BUPIVACAINE LIPOSOME 1.3 |
| 2502501118500000     | BUPIVACAINE, EXPAREL VL 13.3MG/ML (1.3%) 10ML | 25083764           | EXPAREL 1.3% 13.3MG/ML 10ML |
| 2502501118600000     | BUPIVACAINE, EXPAREL VL 13.3MG/ML (1.3%) 20ML | 21214742           | 65250-0266-09 - BUPIVACAINE LIPOSOME 1.3 |
| 2502501201500000     | BUPIVACAINE, EXPAREL INJ 1MG | 17656090           | BUPIVACAINE LIPOSOME(PF) 1.3 % (13.3 MG/M |
| 2502501201500000     | BUPIVACAINE, EXPAREL INJ 1MG | 17676209           | BUPIVACAINE LIPOSOME(PF) 1.3 % (13.3 MG/M |
| 2502501201500000     | BUPIVACAINE, EXPAREL INJ 1MG | 18193781           | BUPIVACAINE LIPOSOMAL 1.3 % SU |
| 2502501201500000     | BUPIVACAINE, EXPAREL INJ 1MG | 18598752           | EXPAREL 1.3 % IJ SUSP |
| 2502501201500000     | BUPIVACAINE, EXPAREL INJ 1MG | 19436080           | BUPIVACAINE LIPOSOME(PF) 1.3 % (13.3 MG/M |
| 2502501201500000     | BUPIVACAINE, EXPAREL INJ 1MG | 19672779           | BUPIVACAINE LIPOSOMAL 1.3 % SU |
| 2502501201500000     | BUPIVACAINE, EXPAREL INJ 1MG | 20327277           | BUPIVACAINE LIPOSOMAL 1.3 % SU |
| 2502501201500000     | BUPIVACAINE, EXPAREL INJ 1MG | 23018001           | 65250026620 BUPIVACAINE LIPOSOME (PF) 1.3 |
| 2502501201500000     | BUPIVACAINE, EXPAREL INJ 1MG | 23794056           | HC BUPIVACAINE LIPOSOMAL 1.3 % SUSP 20 M |
| 2502501201500000     | BUPIVACAINE, EXPAREL INJ 1MG | 24246538           | HC BUPIVACAINE LIPOSOMAL 1.3 % SUSP 20 M |
| 2502501201500000     | BUPIVACAINE, EXPAREL INJ 1MG | 24438218           | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI |
| 2502501201500000     | BUPIVACAINE, EXPAREL INJ 1MG | 24438366           | BUPIVACAINE LIPOSOME 1.3 % IJ SUSP |
| 2502501201500000     | BUPIVACAINE, EXPAREL INJ 1MG | 24500010           | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI |
| 2502501201500000     | BUPIVACAINE, EXPAREL INJ 1MG | 24532715           | BUPIVACAINE LIPOSOME 1.3 % SUSP |
| 2502501201500000     | BUPIVACAINE, EXPAREL INJ 1MG | 24588904           | BUPIVACAINE LIPOSOME 1.3 % SUSP |
| 2502501201500000     | BUPIVACAINE, EXPAREL INJ 1MG | 24672610           | BUPIVACAINE LIPOSOME 1.3 % SUSP |
| 2502501201500000     | BUPIVACAINE, EXPAREL INJ 1MG | 24679655           | BUPIVACAINE LIPOSOME 1.3 % SUSP |
| 2502501201500000     | BUPIVACAINE, EXPAREL INJ 1MG | 24687293           | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI |
| 2502501201500000     | BUPIVACAINE, EXPAREL INJ 1MG | 24687573           | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI |
| 2502501201500000     | BUPIVACAINE, EXPAREL INJ 1MG | 24709099           | BUPIVACAINE LIPOSOME(PF) 1.3 % (13.3 MG |
| 2502501201500000     | BUPIVACAINE, EXPAREL INJ 1MG | 24709674           | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI |
| 2502501201500000     | BUPIVACAINE, EXPAREL INJ 1MG | 24715275           | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI |
| 2502501201500000     | BUPIVACAINE, EXPAREL INJ 1MG | 24720223           | BUPIVACAINE LIPOSOME 1.3 % SUSP |
| 2502501201500000     | BUPIVACAINE, EXPAREL INJ 1MG | 24725700           | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI |
| 2502501201500000     | BUPIVACAINE, EXPAREL INJ 1MG | 24731800           | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI |
| 2502501201500000     | BUPIVACAINE, EXPAREL INJ 1MG | 24737277           | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI |
### Supplemental Table 2. Definition Codes for Liposomal Bupivacaine Analgesia

| Standard Charge Code | Standard Charge Description       | Hospital Charge ID | Hospital Charge Description                                      |
|----------------------|----------------------------------|-------------------|-----------------------------------------------------------------|
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 24805351          | BUPIVACAINE LIPOSOME 1.3 % SUSP                                 |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 24834258          | BUPIVACAINE LIPOSOME 1.3 % SUSP                                 |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 24834797          | BUPIVACAINE LIPOSOME 1.3 % SUSP                                 |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 24860599          | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI                       |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 24873334          | BUPIVACAINE LIPOSOME 1.3 % SUSP                                 |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 24907306          | BUPIVACAINE LIPOSOME 1.3 % SUSP                                 |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 24910906          | BUPIVACAINE LIPOSOME 1.3 % SUSP                                 |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 24935028          | BUPIVACAINE LIPOSOME(PF) 1.3 %(13.3 MG/M                         |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 24947622          | BUPIVACAINE LIPOSOME 1.3 % IJ SUSP                              |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 24964003          | 65250013309 BUPIVACAINE LIPOSOME (PF) 1.3                       |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 24977135          | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI                       |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 24989322          | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI                       |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 25009443          | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI                       |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 25012191          | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI                       |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 25018970          | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI                       |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 25020840          | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI                       |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 25033389          | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI                       |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 25042118          | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI                       |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 25046181          | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI                       |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 25062770          | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI                       |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 25070458          | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI                       |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 25103395          | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI                       |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 25104822          | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI                       |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 25106164          | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI                       |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 25115374          | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI                       |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 25123633          | INJECTION EXPAREL MG                                          |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 25139931          | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI                       |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 25156832          | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI                       |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 25172121          | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI                       |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG     | 25179604          | BUPIVACAINE LIPOSOME 1.3 % SUSP 20 ML VI                       |
### Supplemental Table 2. Definition Codes for Liposomal Bupivacaine Analgesia

| Standard Charge Code | Standard Charge Description | Hospital Charge ID | Hospital Charge Description                        |
|----------------------|-----------------------------|--------------------|-----------------------------------------------------|
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG | 25184235           | BUPIVACAINE LIPOSOme 1.3 % SUSP                     |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG | 25185832           | BUPIVACAINE LIPOSOme 1.3 % SUSP 20 ML VI           |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG | 25199510           | BUPIVACAINE LIPOSOme 1.3 % SUSP 20 ML VI           |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG | 25205840           | BUPIVACAINE LIPOSOme 1.3 % SUSP 20 ML VI           |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG | 25315366           | BUPIVACAINE LIPOSOme 1.3 % SUSP                     |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG | 25333250           | BUPIVACAINE LIPOSOme 1.3 % SUSP                     |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG | 25343295           | BUPIVACAINE LIPOSOme 1.3 % SUSP                     |
| 250250120150000       | BUPIVACAINE, EXPAREL INJ 1MG | 25345126           | BUPIVACAINE LIPOSOme 1.3 % SUSP                     |
| 250888002710000       | BUPIVACAINE PARENTERAL MISC  | 22499392           | 65250-0266-09 - BUPIVACAINE LIPOSOme 1.3            |
### Supplemental Table 3. Conversion Factors for In-Hospital Postsurgical Opioid Consumption in Morphine Equivalents

| Route         | Conversion (Multiplication) Factor |
|---------------|-----------------------------------|
|               | PO                  | IV                  |
| Fentanyl      | IV, IM, IT, PO      | 300                 | 100                 |
| Hydromorphone | IV                  | 20                  | 6.67                |
| Hydromorphone | PO                  | 4                   | 1.3                 |
| Meperidine/Pethidine | IV, SC | 0.3                 | 0.1                 |
| Meperidine/Pethidine | PO | 0.1                 | 0.033               |
| Morphine      | IT                  | 300                 | 100                 |
| Morphine      | IV, IM, SC          | 3                   | 1                   |
| Morphine      | PO                  | 1                   | 0.33                |

Abbreviations: IM, intramuscular; IT, intrathecal; IV, intravenous; PO, oral; SC, subcutaneous.

### Supplemental Table 4. Unadjusted In-hospital Postsurgical Opioid Consumption Outcome After Primary Spine Surgery in Pediatric Patients

|                  | LB   | Non-LB |
|------------------|------|--------|
| In-hospital postsurgical opioid consumption, MMEs | 1337 | 2659   |

Abbreviations: LB, liposomal bupivacaine; MME, morphine milligram equivalent.

### Supplemental Table 5. Unadjusted Opioid-Related Adverse Event Outcomes After Primary Spine Surgery in Pediatric Patients

|                  | LB   | Non-LB |
|------------------|------|--------|
| Patients with ORAEs, % | 22.52 | 21.94  |

Abbreviations: LB, liposomal bupivacaine; ORAE, opioid-related adverse event.

### Supplemental Table 6. Unadjusted Economic Outcomes After Primary Spine Surgery in Pediatric Patients

|                  | LB   | Non-LB | US $   |
|------------------|------|--------|--------|
| LOS, days        | 4.3  | 5.1    |
| Total hospital care costs | 50 917 | 41 595 |
| Major cost items (%) |        |        |
| Room and board   | 9420 (18) | 9266 (22) |
| Central supply   | 28 410 (56) | 18 729 (45) |
| Pharmacy         | 1324 (3)  | 1810 (4) |
| Surgery          | 7972 (16) | 6975 (17) |

Abbreviations: LB, liposomal bupivacaine; LOS, length of stay.