### Table S1: pH of piperacillin/tazobactam solutions during storage

| Time point | FOLFusor LV 10 (Baxter) | Easypump II (B. Braun) |
|------------|-------------------------|------------------------|
|            | 25 mg/mL average pH | Difference from initial | 90 mg/mL average pH | Difference from initial |
| t=0        | 6.70                  | n/a                    | 6.37               | n/a                    |
| t= 7       | 6.61                  | 0.09                   | 6.26               | 0.11                   |
| t= 10 (11) | 6.50                  | 0.20                   | 6.13               | 0.24                   |
| t= 13      | 6.50                  | 0.20                   | 6.11               | 0.25                   |
| t= 13+1    | 6.20                  | 0.50                   | 5.77               | 0.60                   |

### Table S2: Particle counts for 25 mg/mL Piperacillin/tazobactam solutions during storage in FOLFusor LV10 (Baxter) devices

| Timepoint | Sample ID | 10µm count | Mean 10µm count | 95% CI (±) | 25µm count | Mean 25µm count | 95% CI (±) |
|-----------|-----------|------------|----------------|------------|------------|----------------|------------|
| 1         | 210-25-B-1 | 5415.27    | 4585           | 829        | 1060.4     | 578            | 555        |
|           | 210-25-B-2 | 4306.67    |                |            | 79.53      |                |            |
|           | 210-25-B-3 | 4031.93    |                |            | 595.27     |                |            |
| 7         | 210-25-B-1 | 272.33     | 149            | 136        | 224.13     | 96             | 126        |
|           | 210-25-B-2 | 144.6      |                |            | 48.2       |                |            |
|           | 210-25-B-3 | 31.33      |                |            | 16.87      |                |            |
| 10        | 210-25-B-1 | 65.07      | 102            | 89         | 48.2       | 59             | 20         |
|           | 210-25-B-2 | 48.2       |                |            | 48.2       |                |            |
|           | 210-25-B-3 | 192.8      |                |            | 79.53      |                |            |
| 13        | 210-25-B-1 | 79.53      | 128            | 55         | 65.07      | 59             | 28         |
|           | 210-25-B-2 | 127.73     |                |            | 31.33      |                |            |
|           | 210-25-B-3 | 175.93     |                |            | 79.53      |                |            |
| 13+1      | 210-25-B-1 | 127.73     | 133            | 11         | 0          | 21             | 20         |
|           | 210-25-B-2 | 144.6      |                |            | 31.33      |                |            |
|           | 210-25-B-3 | 127.73     |                |            | 31.33      |                |            |
Table S3: Particle counts for 90 mg/mL piperacillin/tazobactam solutions during storage in the FOLFusor LV10 (Baxter) devices

| Timepoint | Sample ID     | 10μm count | Mean 10μm count | 95% CI | 25μm count | Mean 25μm count | 95% CI |
|-----------|---------------|------------|-----------------|--------|------------|-----------------|--------|
| 1         | 210-90-B-1    | 1236.33    | 1328            | 295    | 144.6      | 92              | 52     |
|           | 210-90-B-2    | 1125.47    |                 |        | 65.07      |                 |        |
|           | 210-90-B-3    | 1621.93    |                 |        | 65.07      |                 |        |
| 7         | 210-90-B-1    | 1253.2     | 996             | 352    | 995.33     | 642             | 339    |
|           | 210-90-B-2    | 595.27     |                 |        | 320.53     |                 |        |
|           | 210-90-B-3    | 1139.93    |                 |        | 609.73     |                 |        |
| 10        | 210-90-B-1    | 209.67     | 680             | 900    | 16.87      | 327             | 510    |
|           | 210-90-B-2    | 113.27     |                 |        | 48.2       |                 |        |
|           | 210-90-B-3    | 1718.33    |                 |        | 915.8      |                 |        |
| 13        | 210-90-B-1    | 209.67     | 306             | 83     | 65.07      | 145             | 89     |
|           | 210-90-B-2    | 354.27     |                 |        | 127.73     |                 |        |
|           | 210-90-B-3    | 354.27     |                 |        | 241        |                 |        |
| 13+1      | 210-90-B-1    | 498.87     | 279             | 191    | 0          | 10              | 18     |
|           | 210-90-B-2    | 175.93     |                 |        | 31.33      |                 |        |
|           | 210-90-B-3    | 161.47     |                 |        | 0          |                 |        |

Table S4: Particle counts for 25 mg/mL piperacillin/tazobactam solutions during storage in Easypump II (B. Braun) devices

| Timepoint | Sample ID     | 10μm count | Mean 10μm count | 95% CI | 25μm count | Mean 25μm count | 95% CI |
|-----------|---------------|------------|-----------------|--------|------------|-----------------|--------|
| 1         | 210-25-E-1    | 1253.2     | 1607            | 441    | 368.73     | 193             | 184    |
|           | 210-25-E-2    | 1542.4     |                 |        | 48.2       |                 |        |
|           | 210-25-E-3    | 2024.4     |                 |        | 161.47     |                 |        |
| 7         | 210-25-E-1    | 272.33     | 353             | 346    | 144.6      | 236             | 313    |
|           | 210-25-E-2    | 691.67     |                 |        | 547.07     |                 |        |
|           | 210-25-E-3    | 96.4       |                 |        | 16.87      |                 |        |
| 11        | 210-25-E-1    | 113.27     | 118             | 28     | 65.07      | 38              | 28     |
|           | 210-25-E-2    | 144.6      |                 |        | 31.33      |                 |        |
|           | 210-25-E-3    | 96.4       |                 |        | 16.87      |                 |        |
| 13        | 210-25-E-1    | 337.4      | 257             | 189    | 257.87     | 140             | 147    |
|           | 210-25-E-2    | 368.73     |                 |        | 161.47     |                 |        |
|           | 210-25-E-3    | 65.07      |                 |        | 0          |                 |        |
| 13+1      | 210-25-E-1    | 48.2       | 118             | 82     | 31.33      | 38              | 28     |
Table S5: Particle counts of 90 mg/mL piperacillin/tazobactam solutions during storage in Easypump II (B. Braun) devices

| Timepoint | Sample ID     | 10μm count | Mean 10μm count | 95 % CI | 25μm count | Mean 25μm count | 95% CI |
|-----------|---------------|------------|----------------|---------|------------|----------------|--------|
| 1         | 210-90-E-1    | 161.47     | 1109           | 1054    | 0          | 96.4           | 109    |
|           | 210-90-E-2    | 2024.4     |                |         |            |                |        |
|           | 210-90-E-3    | 1139.93    |                |         |            |                |        |
| 7         | 210-90-E-1    | 79.53      | 353            | 259     | 16.87      | 241            | 236    |
|           | 210-90-E-2    | 385.6      |                |         |            |                |        |
|           | 210-90-E-3    | 595.27     |                |         |            |                |        |
| 11        | 210-90-E-1    | 48.2       | 165            | 218     | 0          | 65.07          | 32     |
|           | 210-90-E-2    | 416.93     |                |         |            |                |        |
|           | 210-90-E-3    | 31.33      |                |         |            |                |        |
| 13        | 210-90-E-1    | 337.4      | 391            | 308     | 257.87     | 31.33          | 257    |
|           | 210-90-E-2    | 113.27     |                |         |            |                |        |
|           | 210-90-E-3    | 723        |                |         |            |                |        |
| 13+1      | 210-90-E-1    | 65.07      | 155            | 82      | 0          | 16             | 16     |

Table S6. HPLC assay results for concentration of tazobactam in FOLFusor LV10 (Baxter) devices

| Timepoint | TAZ % Remaining | 95 % CI | TAZ % Remaining | 95 % CI |
|-----------|-----------------|---------|-----------------|---------|
| 0         | 100% (10.45±0.07 mg/mL) | 0.7     | 100% (3.03±0.03 mg/mL) | 1.0     |
| 7         | 101.6           | 0.3     | 101.3           | 0.3     |
| 10        | 99.6            | 0.2     | 99.9            | 0.5     |
| 13        | 98.7            | 0.4     | 99.2            | 0.4     |
| 13+1      | 98.0            | 0.2     | 100.9           | 0.6     |

*90 mg/ml total drug concentration: 80 mg piperacillin/10 mg tazobactam  
**25 mg/ml total drug concentration: 22 mg piperacillin/3 mg tazobactam

Table S7. HPLC assay results for concentration of piperacillin in FOLFusor LV10 (Baxter) devices

| Timepoint | PIP % Remaining | 95 % CI | PIP % Remaining | 95 % CI |
|-----------|-----------------|---------|-----------------|---------|
| 0         | 100% (83.6±0.3 mg/mL) | 0.4     | 100% (24.1±0.2 mg/mL) | 0.9     |
| 7         | 101.3           | 0.5     | 101.6           | 0.3     |
| 10        | 99.7            | 0.2     | 100.3           | 0.4     |
| 13        | 98.7            | 0.3     | 99.7            | 0.3     |
| 13+1      | 98.0            | 0.2     | 100.9           | 0.6     |

*90 mg/ml total drug concentration: 80 mg piperacillin/10 mg tazobactam  
**25 mg/ml total drug concentration: 22 mg piperacillin/3 mg tazobactam
Table S8. HPLC assay results for concentration of tazobactam in Easypump II (B. Braun) devices

| Timepoint | 90 mg/mL Total drug combination* | 25 mg/mL Total drug combination** |
|-----------|----------------------------------|----------------------------------|
|           | TAZ % Remaining | 95% CI   | TAZ % Remaining | 95% CI   |
| 0         | 100% (9.63±0.09 mg/mL) | 0.9      | 100% (2.72±0.06 mg/mL) | 2.0      |
| 7         | 101.7            | 0.2      | 100.7            | 0.4      |
| 11        | 101.3            | 1.5      | 102.7            | 0.2      |
| 13        | 100.4            | 0.1      | 98.7             | 1.6      |
| 13+1      | 100.9            | 0.6      | 101.5            | 0.1      |

*90 mg/ml total drug concentration: 80 mg piperacillin/10 mg tazobactam  
**25 mg/ml total drug concentration: 22 mg piperacillin/3 mg tazobactam

Table S9. HPLC assay results for concentration of piperacillin in Easypump II (B. Braun) devices

| Timepoint | 90 mg/mL Total drug combination* | 25 mg/mL Total drug combination** |
|-----------|----------------------------------|----------------------------------|
|           | PIP % Remaining | 95% CI   | PIP % Remaining | 95% CI   |
| 0         | 100% (77.6±0.6 mg/mL) | 0.8      | 100% (21.9±0.4 mg/mL) | 2.1      |
| 7         | 101.7            | 0.1      | 100.9            | 0.4      |
| 11        | 101.1            | 1.2      | 102.2            | 0.1      |
| 13        | 100.7            | 0.1      | 98.9             | 1.5      |
| 13+1      | 100.7            | 0.6      | 101.0            | 0.1      |

*90 mg/ml total drug concentration: 80 mg piperacillin/10 mg tazobactam  
**25 mg/ml total drug concentration: 22 mg piperacillin/3 mg tazobactam