# Does Payment Reform Affect Trauma Care? Impact of Maryland’s Global Budget Revenue Program on LOS and Outcomes After Orthopaedic Trauma Injury

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INTRODUCTION:

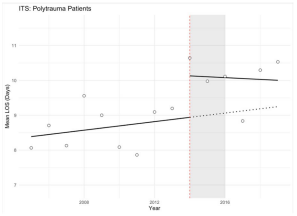
In 2014, Maryland implemented a global budget revenue (GBR) system, an all-payer model designed to cap hospital profits while incentivizing care quality and efficiency. While GBR may reduce hospital length of stay (LOS), its impact on orthopaedic trauma patients is unknown. This study evaluated the association between GBR implementation and hospital LOS, complication rates, and discharge disposition among orthopaedic trauma patients across Maryland.

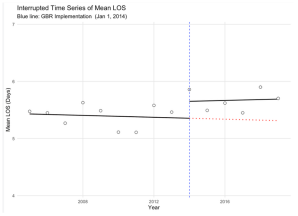
METHODS: Orthopaedic trauma patients presenting to Maryland emergency departments between 2005 and 2019 were identified using the Maryland Institute for Emergency Medical Services Systems (MIEMSS) statewide trauma registry. Patients were categorized based on presentation before (2005-2013) or after (2015-2019) implementation of the Global Budget Revenue (GBR) program, which began on January 1, 2014. Collected variables included patient demographics, length of stay (LOS), mechanism of injury, fracture location, discharge disposition, and in-hospital complications. The primary outcome was LOS, with secondary outcomes including complication rates and discharge disposition.Interrupted time series (ITS) analysis was used to evaluate changes in LOS over time, with separate pre- and post-GBR trends modeled. Categorical variables were compared using chi-square tests, and continuous variables were compared using Kruskal-Wallis tests. A p-value <0.05 was considered statistically significant.

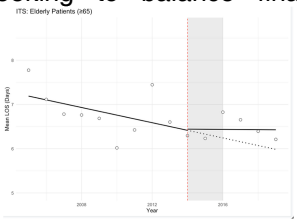
RESULTS:

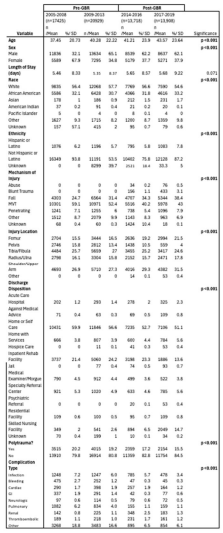
61,561 orthopaedic trauma patients were included for analysis (38,354 pre-GBR; 23,207 post-GBR). Patient characteristics differed significantly between cohorts. Interrupted time series analysis showed no significant change in LOS following GBR implementation (level change: +0.28 days, p=0.24; post-GBR trend: +0.02 days/year, p=0.78). Subgroup analyses demonstrated stable LOS among elderly and polytrauma patients, while upper extremity fractures exhibited a reversal in trend, shifting from a pre-GBR decrease (-0.11 days/year, p=0.027) to a post-GBR increase (+0.25 days/year, p=0.022). Multivariate linear regression demonstrated that GBR implementation was not significantly associated with a change in LOS, but complication rates significantly decreased from 14.6% to 7.3% post-GBR (p<0.001). The proportion of patients discharged home declined modestly from 61.9% to 57.1% (p<0.001).

DISCUSSION AND CONCLUSION: GBR implementation in Maryland was not associated with significant changes in hospital length of stay among orthopaedic trauma patients. Rates of complication after orthopaedic trauma injury decreased, suggesting that cost containment under GBR did not compromise inpatient safety. GBR has potential as a model for healthcare reform in other states seeking to balance financial sustainability with patient safety.



| Variable | Pre-GBR (2005-2013) (n=38,354) | | Post-GBR (2014-2019) (n=13,718) | | Post-GBR (2017-2019) (n=13,998) | | |
|---|---|---|---|---|---|---|---|
| | Mean | %/SD | Mean | %/SD | Mean | %/SD | Significance |
| **Age** | 37.45 | 20.73 | 40.28 | 22.22 | 41.21 | 22.9 | 40.57 |
| **Sex** | | | | | | | |
| Male | 11836 | 32.1 | 19634 | 65.1 | 9039 | 62.2 | 8657 |
| Female | 5569 | 67.9 | 7295 | 34.9 | 5179 | 37.7 | 5271 |
| **Length of Stay (days)** | 5.46 | 8.33 | 5.31 | 8.37 | 5.65 | 8.57 | 5.68 |
| **Race** | | | | | | | |
| White | 9835 | 56.4 | 12068 | 57.7 | 7769 | 56.6 | 7590 |
| African American | 3586 | 32.1 | 6428 | 30.7 | 4066 | 31.8 | 4416 |
| Asian | 178 | 1 | 186 | 0.9 | 212 | 1.5 | 231 |
| American Indian | 37 | 0.2 | 91 | 0.4 | 21 | 0.2 | 29 |
| Pacific Islander | 5 | 0 | 4 | 0 | 8 | 0.1 | 4 |
| Other | 1627 | 9.3 | 1715 | 8.2 | 1293 | 8.7 | 1359 |
| Unknown | 117 | 57.1 | 415 | 2 | 95 | 0.7 | 79 |
| **Ethnicity** | | | | | | | |
| Hispanic or Latino | 1076 | 6.2 | 1196 | 5.7 | 795 | 5.8 | 1083 |
| Not Hispanic or Latino | 10349 | 93.8 | 11191 | 53.5 | 10402 | 75.8 | 12120 |
| Unknown | 0 | 0 | 8299 | 39.7 | 2521 | 18.4 | 3315 |
| **Mechanism of Injury** | | | | | | | |
| Abuse | 0 | 0 | 0 | 0 | 34 | 0.2 | 76 |
| Blunt Trauma | 0 | 0 | 0 | 0 | 166 | 1.1 | 433 |
| Fall | 43003 | 24.7 | 6364 | 31.4 | 4707 | 34.3 | 5344 |
| MVT | 10301 | 59.1 | 10971 | 52.4 | 5516 | 40.2 | 5978 |
| Penetrating | 1241 | 7.1 | 1265 | 6 | 738 | 5.4 | 1096 |
| Other | 1812 | 8.7 | 2079 | 9.9 | 1143 | 8.3 | 963 |
| Unknown | 68 | 0.4 | 60 | 0.3 | 1424 | 10.4 | 10 |
| **Injury Location** | | | | | | | |
| Arm | 2704 | 15.5 | 3444 | 16.5 | 2636 | 19.2 | 2994 |
| Femur | 1746 | 15.8 | 2012 | 13.4 | 1436 | 10.5 | 520 |
| Tibia/Fibula | 4484 | 25.7 | 3819 | 27 | 3455 | 25.2 | 3417 |
| Radius/Ulna | 3798 | 16.1 | 3304 | 15.8 | 2192 | 15.7 | 2471 |
| Shoulder/Upper Arm | 4693 | 26.9 | 5710 | 27.3 | 4516 | 29.3 | 4382 |
| Other | 0 | 0 | 0 | 0 | 14 | 0.1 | 53 |
| **Discharge Disposition** | | | | | | | |
| Acute Care Hospital | 202 | 1.2 | 269 | 1.4 | 278 | 2 | 320 |
| Against Medical Advice | 71 | 0.4 | 63 | 0.3 | 69 | 0.5 | 109 |
| Home or Self Care | 10431 | 59.9 | 11846 | 56.6 | 7235 | 52.7 | 7196 |
| Home with Services | 666 | 3.8 | 867 | 3.9 | 600 | 4.4 | 784 |
| Hospice Care | 0 | 0 | 11 | 0.1 | 41 | 0.3 | 93 |
| Inpatient Rehab Facility | 3737 | 21.4 | 5060 | 24.2 | 3186 | 23.3 | 1886 |
| Jail | 0 | 0 | 77 | 0.4 | 74 | 0.5 | 90 |
| Medical Examiner/Morgue | 790 | 4.5 | 912 | 4.4 | 499 | 3.6 | 522 |
| Specialty Referral Facility | 921 | 5.3 | 1020 | 4.9 | 633 | 4.6 | 785 |
| Psychiatric Referral Residential Facility | 0 | 0 | 0 | 0 | 20 | 0.1 | 53 |
| Skilled Nursing Facility | 109 | 0.6 | 109 | 0.5 | 95 | 0.7 | 109 |
| Unknown | 349 | 2 | 541 | 2.6 | 894 | 6.5 | 2049 |
| **Polytrauma?** | 70 | 0.4 | 199 | 1 | 10 | 0.1 | 34 |
| Yes | 3515 | 20.2 | 4015 | 19.2 | 2359 | 17.2 | 2194 |
| No | 13910 | 79.8 | 16914 | 80.8 | 11359 | 82.8 | 11754 |
| **Complication Type** | | | | | | | |
| Infection | 1248 | 7.2 | 1247 | 6.0 | 785 | 5.7 | 470 |
| Bleeding | 478 | 2.7 | 252 | 1.2 | 47 | 0.3 | 46 |
| Cardiac | 290 | 1.7 | 398 | 1.9 | 257 | 1.9 | 364 |
| GI | 107 | 1.9 | 291 | 1.4 | 42 | 0.3 | 77 |
| Neurologic | 97 | 0.6 | 114 | 0.5 | 79 | 0.6 | 72 |
| Pulmonary | 1052 | 6.2 | 834 | 4.0 | 155 | 1.1 | 150 |
| Renal | 142 | 0.8 | 225 | 1.1 | 348 | 2.5 | 183 |
| Thromboembolic | 189 | 1.1 | 218 | 1.0 | 231 | 1.7 | 161 |
| Other | 1268 | 18.8 | 3483 | 16.6 | 895 | 6.5 | 894 |