

A daily scrum at the gastrointestinal oncology ward shortens the length of stay, a tertiary center experience

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Abstract

Background and aims: Multidisciplinary meetings among medical and paramedical staff can limit the length of stay (LOS) of oncology patients during repeated hospitalizations. We applied the scrum methodology to streamline our discharge planning. This framework originated in IT development to address operational challenges and to allow for rapid adaptation. We aimed to assess whether a daily scrum can impact LOS and the readmission rate.

Methods: We implemented a daily multidisciplinary meeting, called scrum at the 26 bed- Gastro-intestinal (GI) oncology ward of our tertiary center from October 2022 to July 2023. This daily multidisciplinary debriefing determines the exact medical and paramedical criteria for discharge. We compared outcomes during the intervention to a four-year pre-intervention baseline. We applied a linear model to evaluate whether the scrum reduced the LOS while correcting for case mix.

Results: We included a total of 664 GI oncology patients over a 10-month period. The adjusted mean LOS was 4.09 days. After correcting for case mix, LOS decreased significantly during the daily scrum period compared to the four-year pre-scrum baseline (-9.96%, $p=0.011$). Unplanned readmissions within 30 days from discharge did not increase.

Conclusion: Implementing a daily scrum significantly reduced the length of stay at our oncology ward. The scrum framework provides an effective strategy to optimize bed capacity. It minimizes unnecessary hospital days and reduces the risk of suboptimal patient care. (*Acta gastroenterol belg.*, 2026, 89, 451-455).

Keywords: Length of Stay, Patient Readmission, Interdisciplinary Communication, Patient Discharge, Quality Improvement, Oncology.

Background

Frequent hospital admissions impose a substantial burden on oncology patients. Unpredictable and complex medical complications frequently arise throughout the cancer trajectory and force patients to seek acute inpatient care (1). These recurrent hospitalizations place a heavy physical and psychological toll on patients and generate significant societal and economic costs (2). Furthermore, novel antineoplastic therapeutics increased overall survival (OS) but consequently expand the total patient pool requiring hospitalization (3). This growing demand increases the pressure on healthcare systems and providers who are already facing staffing shortages and an escalating need of an aging population (4).

Standard interventions, including standard discharge planning and clinical pathways, fail to reliably reduce the length of stay for medically complex populations. (5). Multidisciplinary meetings and hospital discharge

teams on the other hand can potentially limit the LOS and reduce the number of days with limited medical value. However, without a structured framework, this added complexity can paradoxically delay patient discharges (6–8).

Brief, structured interdisciplinary meetings, known as daily huddles, have shown to improve team communication, and coordination and improve clinical outcomes (9). When implemented as part of structured, multidisciplinary care coordination efforts they can decrease the length of stay (10,11).

Inspired by daily huddles and multidisciplinary discharge teams, we created a small multidisciplinary meeting. To combat the increase in complexity and managerial workload we introduced the ‘Scrum’ methodology in this meeting, which we therefore called a “scrum.”

Scrum is an iterative project management framework originating in IT development that is designed to address complex operational challenges through adaptive, team-based approaches (12). Its principles align with the dynamic coordination required in the care of medically complex pathologies and vulnerable patients.

In this study, we aimed to evaluate the clinical applicability of a multidisciplinary scrum protocol in a digestive oncology ward and measure its effect on hospital length of stay and readmission rates.

Materials and methods

Intervention

We implemented a clinical scrum protocol starting October 1st, 2022.

In these quick meetings the attending oncologist, internal medicine residents, ward head nurse and social workers met daily before midday. During the

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first few weeks, an operational manager was present to train and oversee the participants. A typical scrum lasted approximately 15 min and focused on key issues preventing every ward patient from being discharged without going into detail. After a short discussion, the estimated discharge date was then registered, and a colour code (green for determined, yellow for conditional discharge, red for unknown) was added to in the EMR (electronic medical record). Based on the identified issue, the appropriate member was tasked to resolve it. Every member of the scrum had different responsibilities (Appendices 1 and 2):

- *Attending oncologist/resident:*
 - Determination of the medical discharge date
 - Optimize medical examination planning
 - planning of future follow-up
- *Head nurse:*
 - Leads the meeting
 - Communicating discharge date with the patient and family
- *Social workers*
 - Accommodates social problems before determined the discharge date
 - Communicates with family

End points

Average length of stay (LOS)

In this study, the length of stay (LOS) was designated as the primary outcome. It was calculated by dividing the cumulative number of inpatient days by the total number of admissions or discharges over the study period. LOS data were limited to patients admitted to our ward.

Readmission rate

The readmission rate, defined as the proportion of patients readmitted within a specified interval—commonly 7 or 30 days—following hospital discharge, serves as an important quality metric. Elevated readmission rates have been associated with adverse patient outcomes. Notably, early readmissions (within 7 days) are more likely to be attributable to factors related to the initial hospitalization. This study assessed the all-cause readmission rate within 30 days as a secondary end point to confirm that our scrum intervention was associated with a sustainable drop in the LOS.

Data extraction and enrichment

Length of stay data were extracted from the electronic patient records alongside patient age for all inpatients at the UZ Leuven GI Oncology ward for the period of January 2018 to June 2024. The period prior to the

start of the daily scrum (October 2022) was labelled as pre-scrum and the period after the change in supervising MDs was labelled as post-scrum (August 1st, 2023, until June 30th, 2024). The period of active daily scrums was simply labelled as scrum (October 1st, 2022, until July 31st, 2023).

As length of stay can be affected by a multitude of factors including case-mix, the dataset was further enriched with 3MTM All Patient Refined Diagnosis Related Groups (APR-DRG 38.0) labels for each stay, as well as APR-DRG and Severity of Illness (SOI) case weights (both are based on the registered diagnoses and procedures for each patient at discharge).

Data analysis

A linear model was built via R (v4.4.2) with length of stay as the dependent variable and the different scrum-periods as the main independent variable (categorical). Patient age (numerical), APR-DRG grouper (categorical), APR-DRG-SOI case weight (numerical), in-hospital survival (categorical) and an adjustment for the disruption during the COVID-19 period (years 2020 and 2021; categorical) were also added as independent variables to correct for case-mix changes. Length of stay was log-transformed to conform to the normality assumption of the linear model. For clinical interpretability, we converted the logarithmic estimates back into standard hospital days and reported the adjusted means.

Maximum likelihood testing was used to determine the statistical significance of the effect of each independent variable on length of stay. The “emmeans” R package was used to facilitate the calculation of marginal means for the scrum independent variable, as well as to calculate contrasts between each level of scrum (including a Tukey post hoc correction).

For the analysis of the readmission rate, we used the same methodology as for the length of stay (LOS), except for the transformation: since readmissions involve probabilities, a logistic model was used.

Results

A total of 664 GI oncology patients were hospitalized between October 2022 and July 2023. We found a significant decrease in the adjusted mean length of stay (LOS) during the scrum period compared with the pre-scrum baseline with estimated adjusted mean length of 4.09 days (CI 3.83-4.37 days) vs. 4.52 days (CI 4.37-4.66 days) ($P = 0.011$), (-0.43 days or -9.96%). This reduction persisted in the post-scrum period (estimated adjusted mean: 4.1 days) (CI 3.88-4.33 days), which also was associated with a significant reduction in the LOS compared with the pre-scrum period ($P = 0.003$). We observed no significant difference between the scrum and post-scrum periods ($P = 0.9994$), suggesting the persistence of the intervention’s impact beyond its active implementation period. (Figure 1).

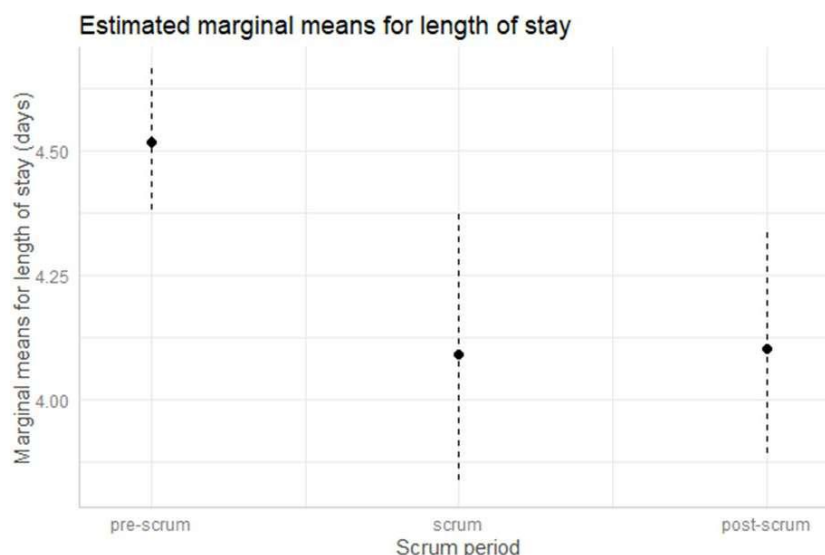


Figure 1. — Estimated marginal means for length of stay for each scrum period. The dots indicate the estimated average, whereas the dashed lines represent the 0.95 confidence interval. Contrasts between each level revealed a significant difference in the length of stay between the pre-scrum and the scrum period ($p = 0.011$) and between the pre-scrum and the post-scrum period ($p = 0.003$). No significant difference was found between the “scrum” and post-scrum ($p = 0.9994$).

In the semester-based analysis of the LOS from 2018 to mid-2024 weighted for the APR-DRG Severity of Illness (SOI) by colour (Figure 2), the LOS remained consistently above 6 days, with a moderate variation in case weights. During the scrum intervention, a decline in the adjusted mean LOS of approximately half a day was observed, reaching its lowest point in the first semester of 2023. Notably, this reduction occurred despite an increase in average case weight during the scrum period, suggesting that decrease in the LOS was not attributable to reduced patient complexity. In the post-scrum period (after the second dashed line), LOS increased slightly but remained below preintervention levels, whereas the case weight returned to intermediate levels.

While the adjusted mean LOS was reduced even with an increased case complexity, we observed no difference in the 30-day readmission rate between the pre-scrum period and the scrum period ($p = 0.6101$). (Figure 3). Neither did we observe a significant difference between the pre-scrum and post-scrum period.

These results suggest that the introduction of a structured, multidisciplinary scrum meeting was associated with a statistically and clinically meaningful reduction in hospital LOS, which was maintained even after the intervention ceased. Importantly, this improvement occurred independently of case severity, as measured by APR-DRG SOI weights, and did not increase the 30-day readmission rate.

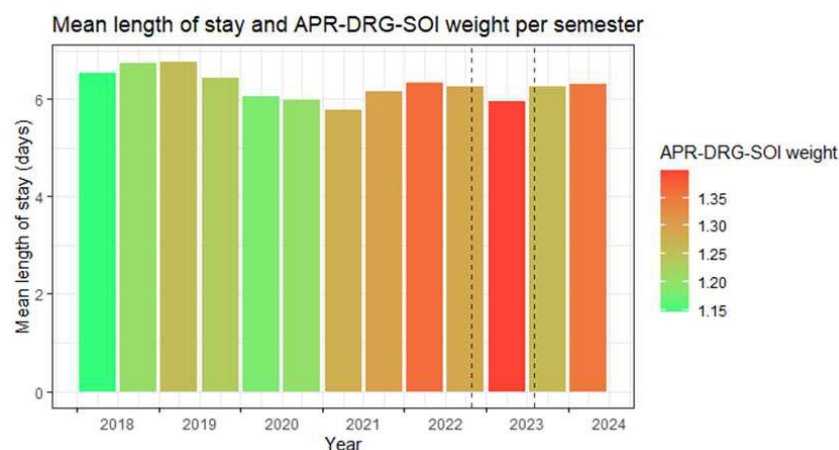


Figure 2. — Mean length of stay and case weight for a GI oncology ward at UZ Leuven. The main bars indicate the adjusted mean length of stay for each semester, whereas the color of each bar corresponds to the case weight. The start and end of the active scrum period is marked by vertical dashed lines.

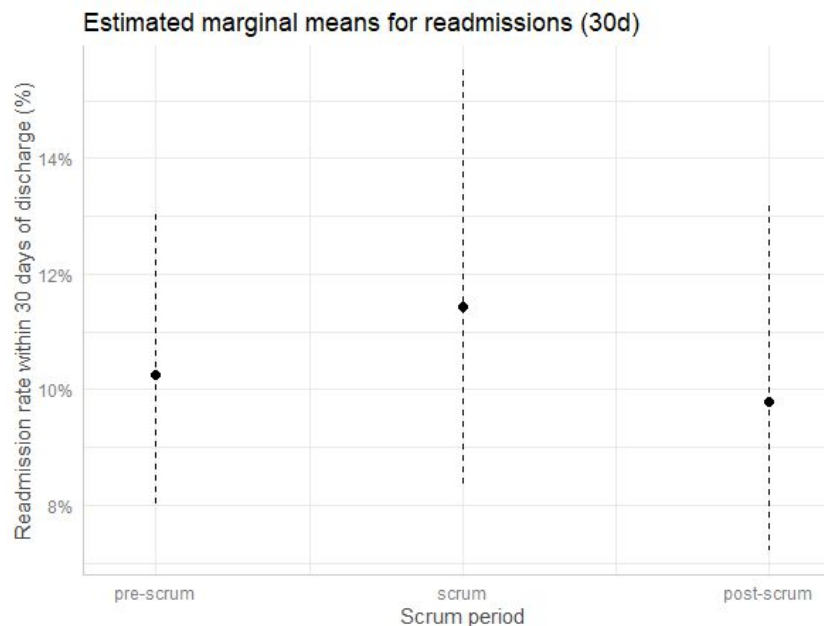


Figure 3. — Estimated marginal means for readmission rate within 30 days for each scrum period.

The dots indicate the estimated average, whereas the dashed lines represent the 0.95 confidence interval. Contrasts between each level reveal no significant difference in the readmission rate between the three different periods.

Discussion

This study evaluated the impact of a short, structured and multidisciplinary scrum meeting on hospital length of stay (LOS) and readmission rates in a gastrointestinal oncology ward. We observed a statistically significant reduction in the adjusted LOS during the active scrum period compared with the pre-intervention phase. Although clinically modest, this reduction can translate into substantial gains in bed availability, improved patient flow, and reduced healthcare costs in high throughput oncology wards.

Surprisingly, this decreased LOS was maintained after the active intervention had ceased. This implies a sustained effect on ward discharge culture and care coordination. Importantly, these findings occurred with an increase in case complexity, as demonstrated by the increased APR-DRG severity weight during the intervention period. A unique finding of our study is that the effects of the intervention persisted after the formal daily scrum meetings were no longer actively held. Most studies on LOS reduction have reported only on the outcomes during or immediately after the intervention periods (5,8,11,13). To our knowledge few studies measured outcomes after the intervention was ceased. This continued effect suggests that the scrum implementation changed the mindset of the care team and changed their approach to discharge planning.

Our scrum intervention maintained a stable 30-day readmission rates following the implementation of the scrum meetings. This outcome aligns with multiple systematic reviews showing that careful reductions in hospital LOS are in general not associated with higher

rates of 30-day readmission across a range of medical and surgical conditions (5,13). These findings suggest that the scrum strategy reduces the LOS without sacrificing the quality or continuity of care.

A common criticism of multidisciplinary hospital discharge teams (HDTs) is the risk of further increasing the workload of clinical teams, which can prevent from direct patient care. However, the SPEEd programme of Hough et al (14) or the HDT programme of Falcetta et al (11) both already showed that short meetings of HDTs effectively reduce LOS in a clinically relevant way. Hough et al even managed to reduce readmissions within 30 days in older patients (14). Our study adds to this growing body of literature that shows that short, high-impact meetings focused on discharge barriers can reduce LOS without increasing staff workload too much. This balance is essential: creating space for coordination without displacing clinical responsibilities.

Our study was limited by its retrospective design. While the length of stay represents an objective metric, our analysis relies on administrative APR-DRG and Severity of Illness scores to correct for patient complexity. Medical coders generate these scores retrospectively based on the available clinical documentation. Any variation or systemic improvement in medical documentation practices over the study period could therefore influence the calculated case weights independently of true clinical severity. Another limitation involves our readmission tracking. We solely detected readmissions within our own centre due to limited data integration across regional hospitals. However, as a tertiary referral centre, external hospitals frequently refer our oncology patients back to us

during severe acute events. Therefore, a significant underestimation of the true readmission rate remains unlikely.

Finally, our intervention primarily targeted operational and medical discharge barriers. We acknowledge that complex non-medical factors frequently prolong hospitalizations. Aging patient populations often present with significant comorbidities and face complex housing and social support challenges. Our daily scrum did not directly resolve these external systemic barriers. Future interventions addressing these specific social factors could aid in further reducing the length of stay.

Conclusion

A daily scrum at the GI oncology ward significantly reduces the LOS without impacting the readmission rate. The scrum framework is a useful tool to optimize bed capacity and reduce unnecessary hospitalization days for digestive oncology patients.

Declarations

Conflict of interest: The authors declare that they have no conflicts of interest to disclose, including any financial or non-financial interests in the subject matter or materials discussed.

List of abbreviations

LOS: length of stay
GI: gastro-intestinal
APR DRG: All Patient Refined Diagnosis Related Groups
OS: overall survival
HDTs: hospital discharge teams
EMR: electronic medical record
SOI: severity of illness
CI: confidence interval

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