

Exploring an Imputation Strategy for TQIP ICU Days from Hospital Data

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Introduction

- LITES Task Order One (TO-001)
 - Linking Investigations in Trauma and Emergency Services (LITES)
 - <https://www.litesnetwork.org/>
- Data
 - Trauma Quality Improvement Program (TQIP) datasets
 - In-hospital electronic health records (EHR)
 - Electronic health records from pre-hospital transport services

Motivation

In-hospital ICU status	TQIP reports ICU days = null	TQIP reports ICU days = 0
Patients in ICU	100	404
Patients not in ICU	518	0

Table 1: TQIP values by In-hospital ICU status.

* TQIP total records = 77,538

Current Approach

Impute missing ICU days with TQIP ventilation days.

- ICU and ventilator days are highly correlated with $r=0.87$.

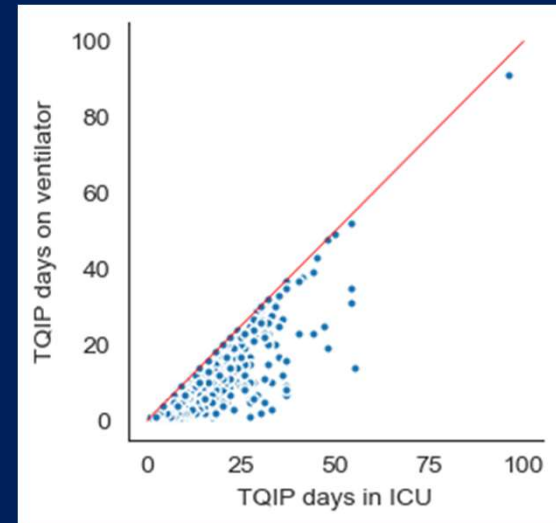


Figure 1: TQIP days in ICU by TQIP days on ventilator with 45° line with sample data ($n=1,115$), see Method step 5 below.

Study Objective

Estimate ICU length of stay (LOS) from in-hospital location records and estimate Lin's Concordant Correlation Coefficient (CCC) to assess agreement with TQIP reported ICU days.

Method

1. Evaluate the 504 records where in-hospital location records and TQIP disagree.
2. Evaluate the 518 records where in-hospital locations records and TQIP agree.

ICU status	Total Records	Average ventilation days (SD)	25 th , 50 th , 75 th , 85 th of ventilation days
TQIP ICU days are 0 or null, but in-hospital ICU records exist	504	7.14 (9.18)	1, 4, 8, 14
TQIP ICU days are null, and in-hospital ICU records do not exist	518	1.21 (0.98)	1, 1, 1, 1

Table 2: Summary of TQIP ventilation days by agreement with in-hospital ICU records.

Method

3. Estimate ICU LOS using a record-by-record count of days from in-hospital ICU location records.
4. Test the algorithm by comparing two methods for calculating hospital LOS.
5. Evaluate agreement between the estimated ICU LOS and TQIP ICU LOS using Lin's Concordant Correlation Coefficient (CCC).

Results

	CCC	95% CI
New Method	0.86	(0.85, 0.88)
Current Approach	0.72	(0.69, 0.74)

Table 5: Lin's Concordant Correlation Coefficient (CCC) with 95% confidence interval with sample data (n=1,115).

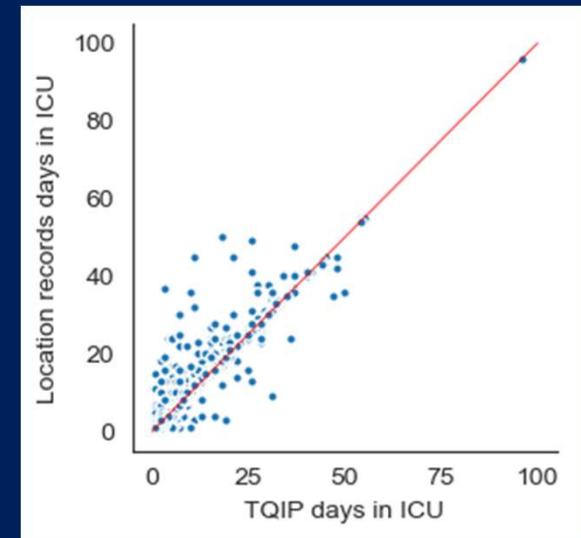


Figure 2: TQIP days in ICU by record-by-record count of days in ICU from in-hospital location records with 45° line with sample data (n=1,115).

Conclusion

- The data show better agreement between TQIP ICU LOS and the estimated ICU LOS from in-hospital location records ($CCC=0.86$) than between TQIP ICU LOS and TQIP ventilation days ($CCC=0.72$).
- Based on the results from this study, we can impute TQIP ICU LOS when records meet these criteria:
 - In-hospital records indicate patients were in the ICU.
 - TQIP ventilation days are greater than 0.
 - TQIP ICU days are 0 or null.

Contact and Access

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GitHub



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