Leveraging Tele-Critical Care to Support Rural Hospitals: Insights from a Mississippi Implementation

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BACKGROUND

- Rural hospitals often lack access to critical care physicians (intensivists), leading to delays in critical care decision-making, higher transfer rates, and increased strain on limited resources.
- To address this need, a Tele-Critical Care program was implemented at Copiah County Medical Center and Greenwood Leflore Hospital to provide remote critical care support and evaluate its utilization and outcomes.
- Tele-Critical Care (TCC) allows intensivists to support bedside clinicians remotely through telemedicine technology, enabling specialist input without requiring on-site presence.

Tele-Critical Care Program

Local Hospital
- 24/7 access to critical care providers
- Need to prevent unnecessary transfers and improve clinical outcomes

Remote Out-of-State Providers
- ✓ Access to EHR
- ✓ Access to PACS
- ✓ 24/7 schedule

OBJECTIVE

To evaluate the utilization patterns of the Tele-Critical Care (TCC) program, including the most common reasons for patient admission and TCC consultation in two rural Mississippi hospitals.

To examine patient characteristics and clinical outcomes associated with TCC use, including time-to-consultation, length of stay, and discharge status.

METHODS AND RESULTS

Data collected included patient demographics, consultation timing, reasons for admission and initial consultation, follow-up encounters, discharge status, and provider orders. Reasons for admission and consultation were extracted from free-text clinical notes using a rule-based natural language processing approach (regular expressions), with manual validation by a clinical expert. Only the reason for the initial consultation was considered for each patient encounter. Analyses included descriptive statistics, one-way ANOVA (discharge status vs. time-to-TCC), and correlation analysis (time-to-TCC vs. length of stay).

Table 1. Source of Data

Hospital	Data collection		Duration
	start	end	
Copiah	November 2023	July 2024	9 months
Greenwood	April 2024	August 2024	5 months

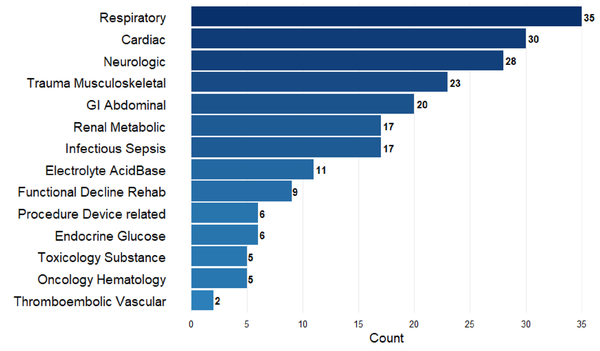
Table 2. Utilization of TCC Consultations

Hospital	Consultation records
Copiah	134
Greenwood	126
Total	**260**

Table 3: Demographic Table

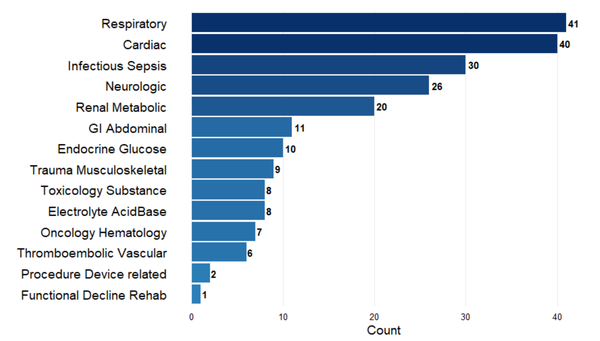
Characteristic	Category	Number of Patients	Percent
Sex			
	Female	74	51.0%
	Male	71	49.0%
Race			
	Black	94	64.4%
	White	48	32.9%
	Other	3	2.1%
Rural-Urban Classification			
	Micropolitan	91	63.2%
	Small town	42	29.2%
	Rural	5	3.5%
	Metropolitan	5	3.5%

Figure 2. Reason for Hospital Admission



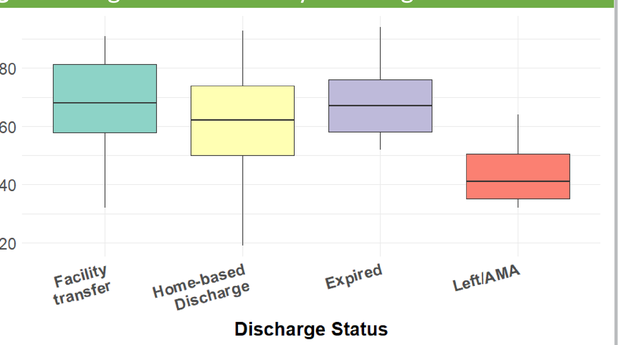
Respiratory illnesses were the most frequent admission category (35 admissions), followed by cardiac (30) and neurologic (28) conditions.

Figure 3. Reason for TCC Consultations



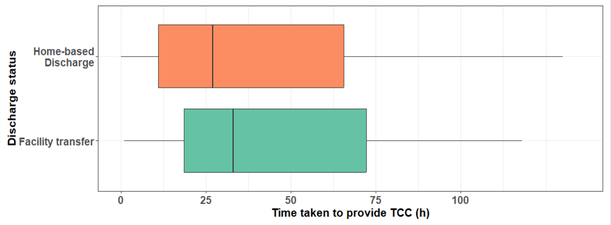
The most frequent reasons for tele–critical care consultation were respiratory and cardiac conditions.

Figure 4. Age Distribution by Discharge Status



Older patients were more common among expired and facility-transfer groups, while younger patients were more likely to leave AMA.

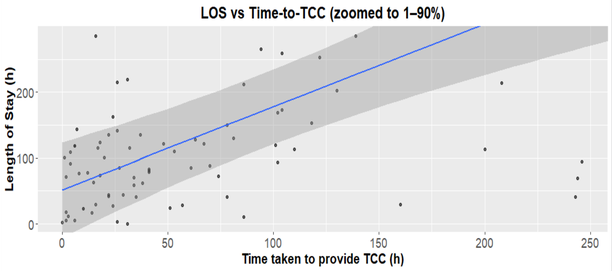
Figure 5. Time-to-TCC Across Discharge Outcomes



Anova-test:

One-way ANOVA showed a significant difference in time-to-TCC among discharge outcome groups ($F = 4.55$, $p < 0.001$), indicating that patients' discharge disposition may be related to how quickly tele-critical care consultation was initiated.

Figure 6. Relationship between Time-to-TCC and Length of Stay



Correlation test:

Correlation analysis showed a moderate positive relationship between time-to-TCC and hospital length of stay ($r = 0.48$, $p < 0.000001$), indicating that longer delays in tele-critical care consultation were associated with longer hospital stays.

CONCLUSION

The Tele-Critical Care (TCC) program was actively utilized in two rural Mississippi hospitals, with respiratory and cardiac conditions being the most common reasons for consultation and most patients requiring only a single TCC encounter. Earlier TCC consultation was associated with shorter hospital length of stay, suggesting that timely remote specialist involvement may improve care delivery in rural hospitals.

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