



Telehealth Wound Severity Scale (TeWSs) Utility



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Introduction

Telehealth has become integral to wound management, yet validated tools to triage wound severity remotely remain limited. The Telehealth Wound Severity Scale (TeWSs) was developed to provide structured, decision-support for clinicians during virtual wound assessments. We aimed to evaluate the predictive performance of TeWSs for determining the need for in-person care and to identify optimal cutoff points for clinical triage

Methods

We conducted retrospective analyses of two telehealth wound care datasets comparing the TeWSs vs actual outcome.

- Cohort 1 (C1) N=951
- Cohort 2 (C2) N=1,351

Total TeWSs was calculated by summing all components variables (range 0–9). Classification performance was evaluated at two thresholds:

- ≥ 5 vs 0–4 (original triage cutoff)
- ≥ 4 vs 0–3 (ROC-derived cutoff)

Receiver Operating Characteristic (ROC) analysis was used to evaluate discrimination between Office Visit (OV)/ER outcomes.

Optimal cutoff for the unweighted score was identified by maximizing sensitivity and minimizing false negatives.

Stepwise logistic regression models were used to derive weighted scoring systems:

- Significant predictors only (SPO)
- All predictors (A)
- all predictors with 2-way interactions (PI)

Model performance was assessed using:

- Sensitivity
- Specificity
- Accuracy
- F1 Score
- Area Under the Curve (AUC) of OV/ER

• Analyses were performed using SAS v9.4 and R v4.3.

Results

Telehealth Wound Severity Scale			
Fever (Tmax)	0= none 1= <101 F 2= >101 F	Wound tenderness	0= none 1= some/unchanged 2= increasing
Wound size	0= smaller 1= unchanged 2= larger	Odor	0= none 1= some/unchanged 2= increasing
Wound color	0= pink/red 1= brown/unchanged 2= black	Limb swelling	0= none 1= some/unchanged 2= increasing
Surrounding skin	0= normal 1= some/unchanged 2= red	Draining	0= none 1= some/unchanged 2= increasing
Wound pain	0= none 1= some/unchanged 2= increasing	AM sugar	0= < 200 1= 200-300 2= > 300
TeWSs source		0-4 -> follow up telehealth call 5-8 -> office visit >8 -> ER or urgent care	

Table 1. Telehealth Wound Severity Scale created to evaluate wounds of different etiologies

Model	Sensitivity	Specificity	Accuracy	F1 Score	AUC
Unweighted ≥ 5	0.20	0.91	0.80	0.23	0.58
Unweighted ≥ 4	0.32	0.81	0.73	0.27	-
Weighted SPO	0.40	0.76	0.71	0.29	0.61
Weighted A	0.62	0.71	0.70	0.38	0.70
Weighted PI	0.65	0.78	0.76	0.45	0.77

Table 2. Weighted SPO (Significant predictors), Weighted A (All predictors), Weighted (PI), AUC for OV/ER

Discussion

- TeWSs can provides structure for telehealth wound assessments
- Unweighted scores demonstrated moderate discrimination
- Weighted PI model significantly improved predictive performance (AUC 0.77)
- A cutoff of ≥ 4 may enhance triage sensitivity in telehealth workflows, improving sensitivity for identifying patients requiring in-person evaluation

Clinical Takeaways

- Weighted model with interaction performs best (AUC 0.77)
- TeWSs may provide a practical triage tool for telehealth wound evaluation, with improved predictive performance when weighted scoring models are applied.
- Next steps would be Prospective validation and possible telehealth integration

Key References

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