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Research Abstracts

Networks Analysis of Clinical Outcomes for Multidisciplinary Care in Burn ICU Teams

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Introduction: Multidisciplinary teams in Burn ICU care have complex interactions directly related to clinical outcomes. Previous work has demonstrated network analysis can effectively deconstruct EMR activity and clinical teams to identify degrees of interconnectedness between providers. Other work has demonstrated the utility of indices for provider networks and clinical outcomes like shared positive outcomes ratios(SPOR). We hypothesize network analysis of burn team interactions can demonstrate quantifiable differences in clinical outcomes.

Methods: In this quantitative study, a single institution's EMR was queried for all burn patients admitted to the regional burn center from 2007 - 2023. Patients 18 years-old, length-of-stay 5-31 days, and total body surface area ≥20% met the inclusion criteria. Activities and associated healthcare providers were extracted and divided into survivor or non-survivor groups. Networks of provider-provider interactions were constructed based on shared patient encounters and clinical outcomes were stratified based on network interconnectedness and number of interactions. Statistics were performed using R-Studio and SAS Enterprise Guide, and network provider analytics derived using Neo4j.

Results: 130 unique encounters and 9,301 patient-provider interactions with 40 unique provider roles were analyzed. 374,450 provider-pair interactions were included in the analysis. Roles included burn providers, residents, nurses, admin, therapy, and case manager. Median number of shared encounters per provider-pair was 8 (6-81). Survival rate mean of provider roles was 72.29%(15.38%-100%). Survival rate mean of unique provider-provider pairs was 71%(0-100%). SPOR value mean for provider-pairs was 0.98(0-1.78).

Conclusions: Network analysis provides insight into team dynamics and clinical outcomes and potentially provide insight into optimization of team structure. Future work will include a subset analysis of risk-adjusted outcomes. Additionally, provider-patient networks can be used to coalesce teams that provide better patient outcomes. Visualizations will be generated to represent outcomes and demonstrate the impact of various teamwork factors on clinical outcomes in the Burn ICU network.

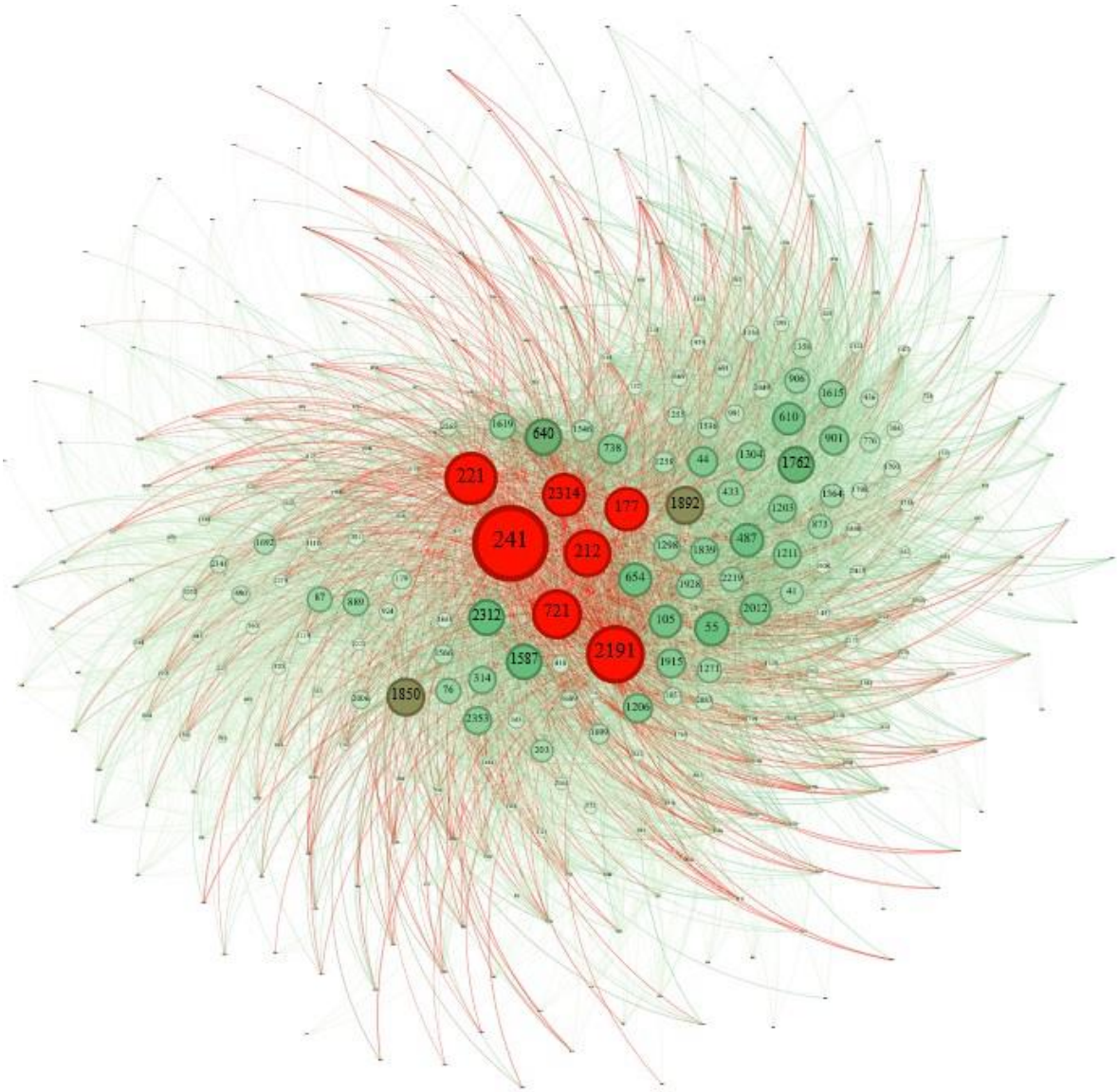

Figure 1. Shared positive outcomes ratio (SPOR) network visualization of provider-pairs. Edge weights and color distribution are based on SPOR index. Nodes represent individual providers with unique label IDs, with size based on degree of connectivity in the network.