

Outlying Factors Increasing Length of Stay in Patients with *Staphylococcal* Sepsis at the University of Colorado Hospital, A Preliminary Quality Improvement Study



Colin Malaska BS, MS4¹, Samuel Porter MD²
University of Colorado School of Medicine¹
CU Division of Hospital Medicine Quality and Patient Safety²



Institute for Healthcare Quality,
Safety and Efficiency

Background

- From March 2021 to March 2022 at UCH, patients with a diagnosis of *Staphylococcal* sepsis had a median length of stay (LoS) 2.04 days past their expected discharge date
- In contrast, all other diagnoses had a combined median LoS of -0.41 days from expected (Statistically significant with a p-value of <0.001 via a Mann-Whitney-U test). See **Figure 2**.

Study Aims

- Gather data from a cohort of patients within this *Staph* sepsis subgroup who exceeded their expected length of hospital stay
- Isolate possible factors driving their extended LoS
- Eventually formulate an interventional protocol to address these factors

Methods

- Retrospective analysis was conducted on a random sample of 15 patients within the *Staph* sepsis subgroup at UCH from 2021 to 2022
- Staph* bacteremia was defined as any strain of *Staphylococcus* detected in a blood culture that was subsequently treated by the providing team as a primary infectious cause and not documented as contaminate (See **Figure 1** for speciation and sensitivity)

Qualitative

- Medical decision-making notes from primary team and all consulting clinical teams
- Case management notes
- Advanced directive information
- Social work notes
- Rehabilitation facility notes
- Documentation from family meetings

Quantitative

- Duration of admission
- Time to procedure
- Number of procedures
- Time in ICU
- Number of infection sites
- Number of consults
- Time to consult the infectious disease team

- Additional data was compiled on the following: medical unit placement within UCH, presence of encephalopathy during admission, history of diabetes, and degree of glycemic control during admission

Results

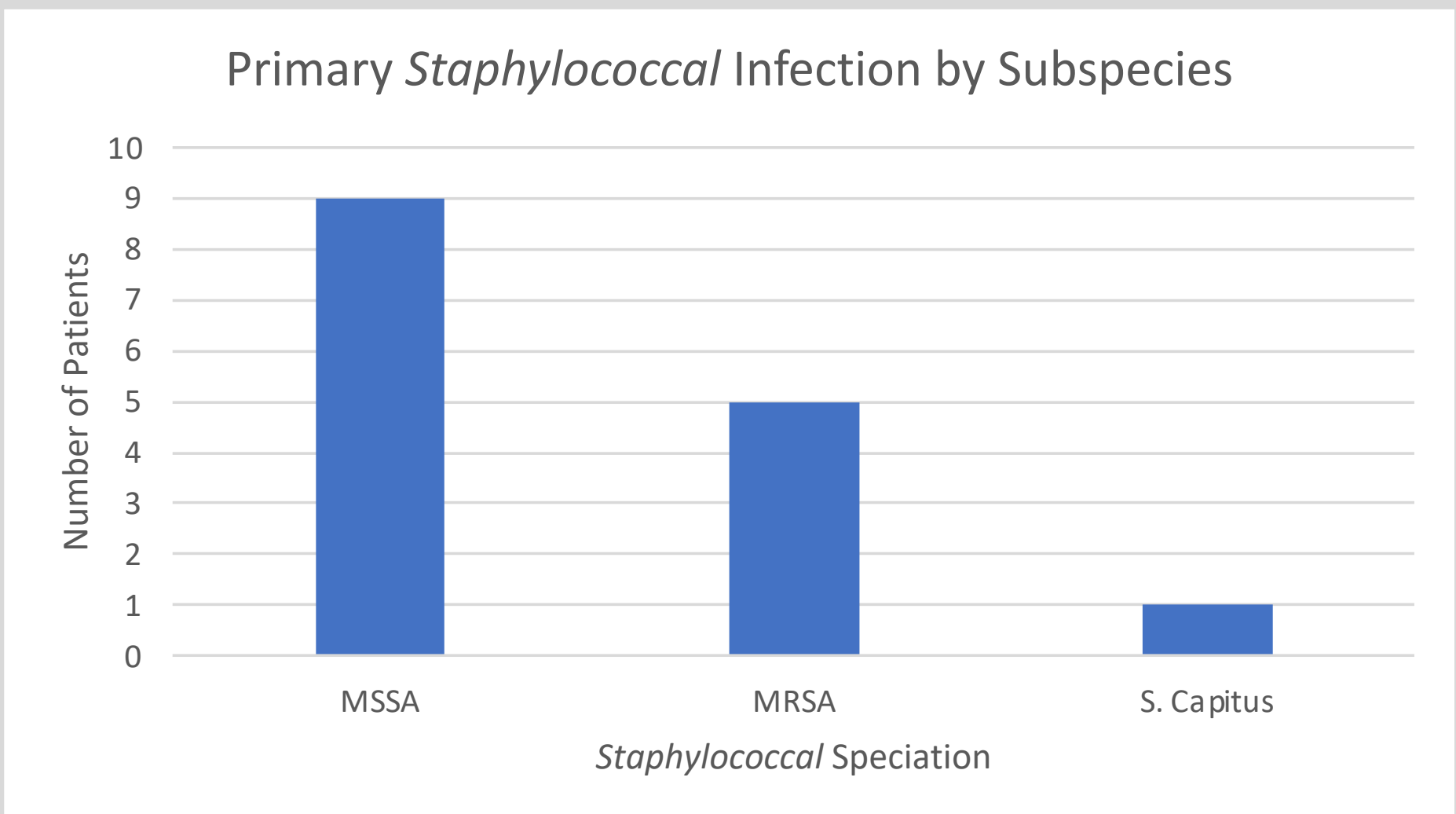


Figure 1: Speciation and sensitivity data from blood cultures of the 15 patients in this cohort. Of note, no patients had history of IV drug use.

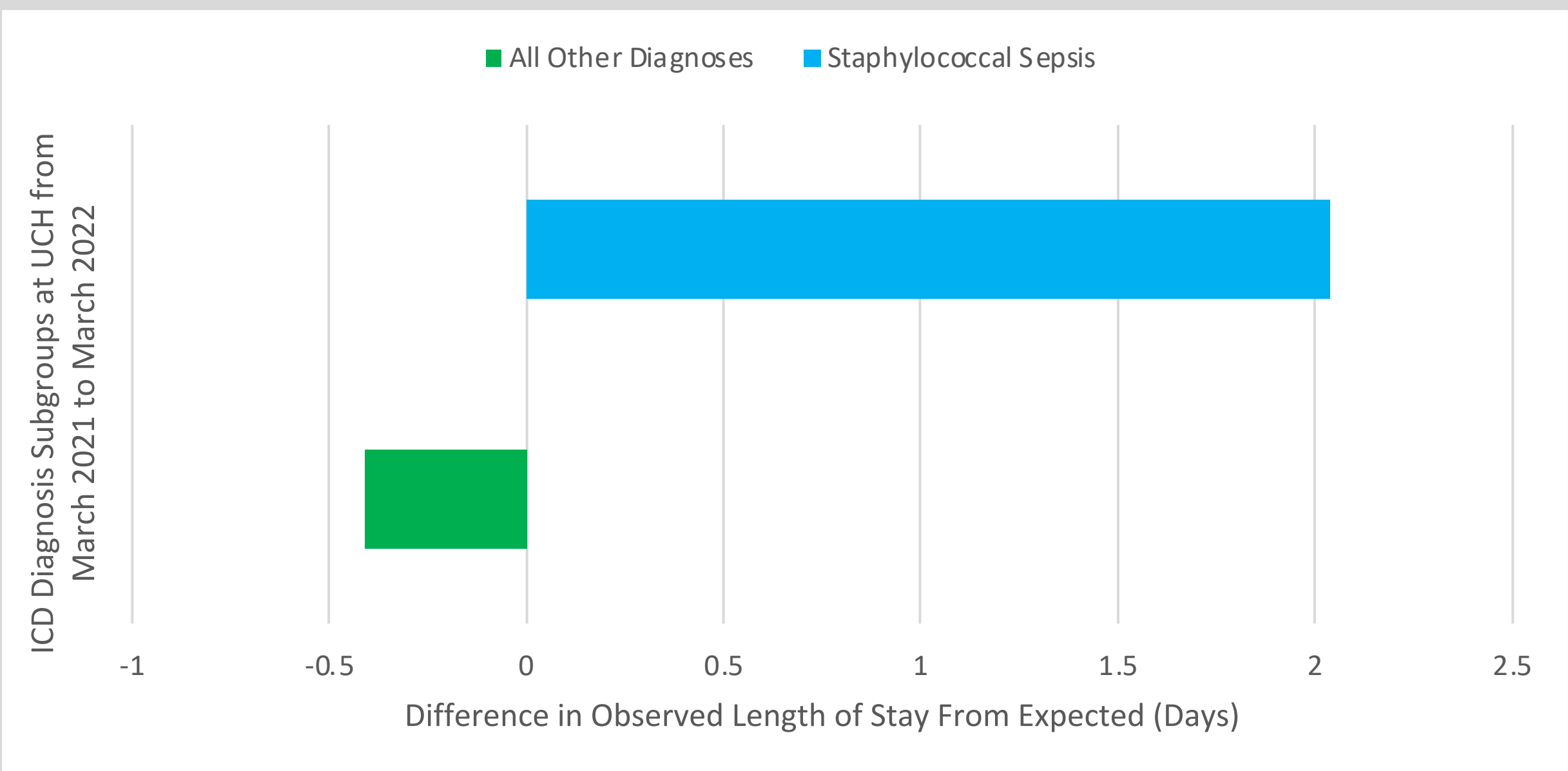


Figure 2: Results from preliminary background analysis to identify diagnostic subgroups at UCH that were outliers for having longer-than-expected length of hospital stay. The X-axis represents the difference in days of the observed length of admission from the expected length of stay. Expected length of stay is determined through national benchmarks according to each patient's diagnoses during a hospital stay. Results are statistically significant with a p-value of <0.001 via a Mann-Whitney-U test.

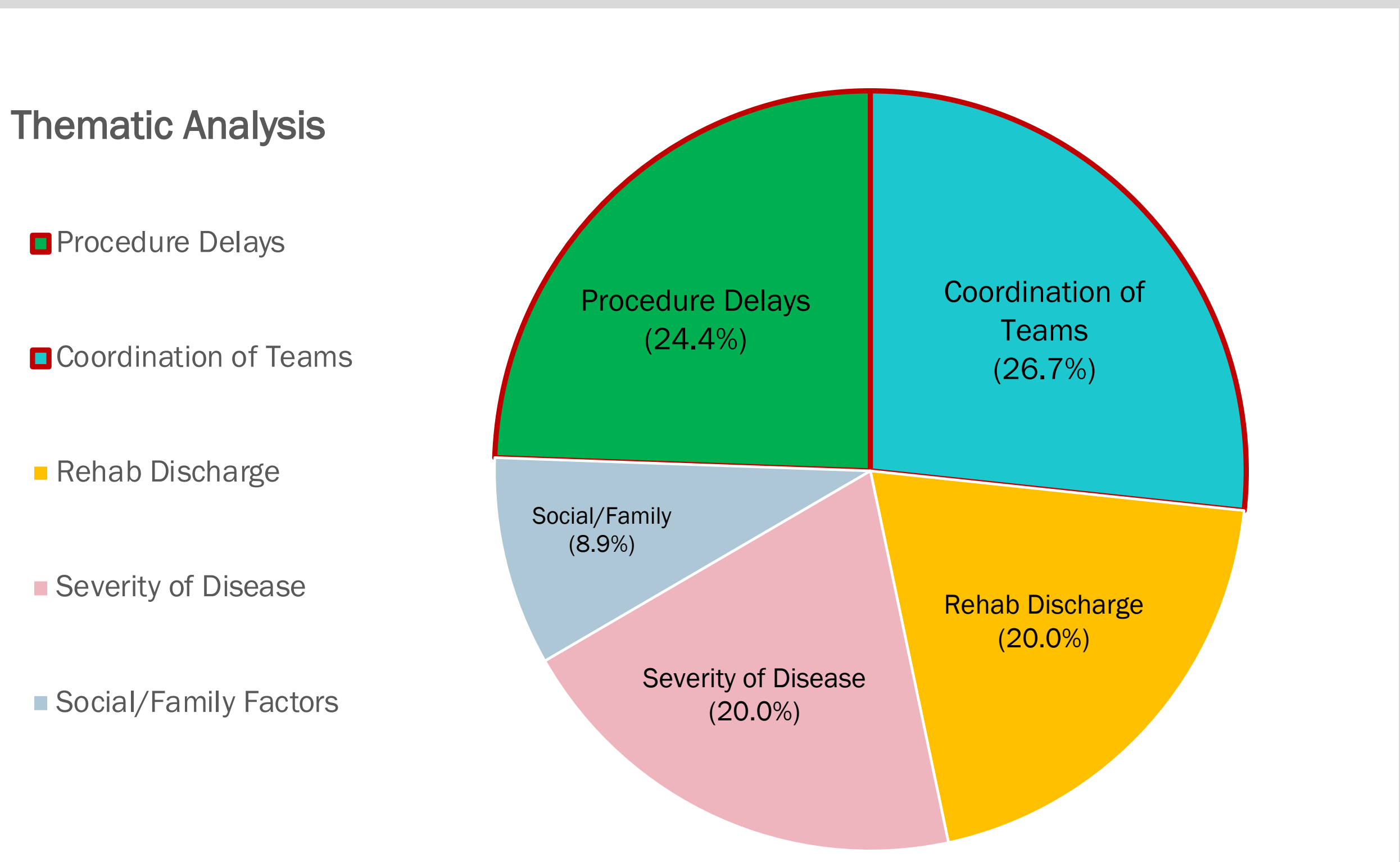


Figure 3: This graph displays the common documented reasons theorized to have contributed to increased length of stay, extrapolated from patient charts via thematic analysis. The prevalence of these possible LoS drivers within the cohort is displayed in the chart, with the two most common themes outlined in red.

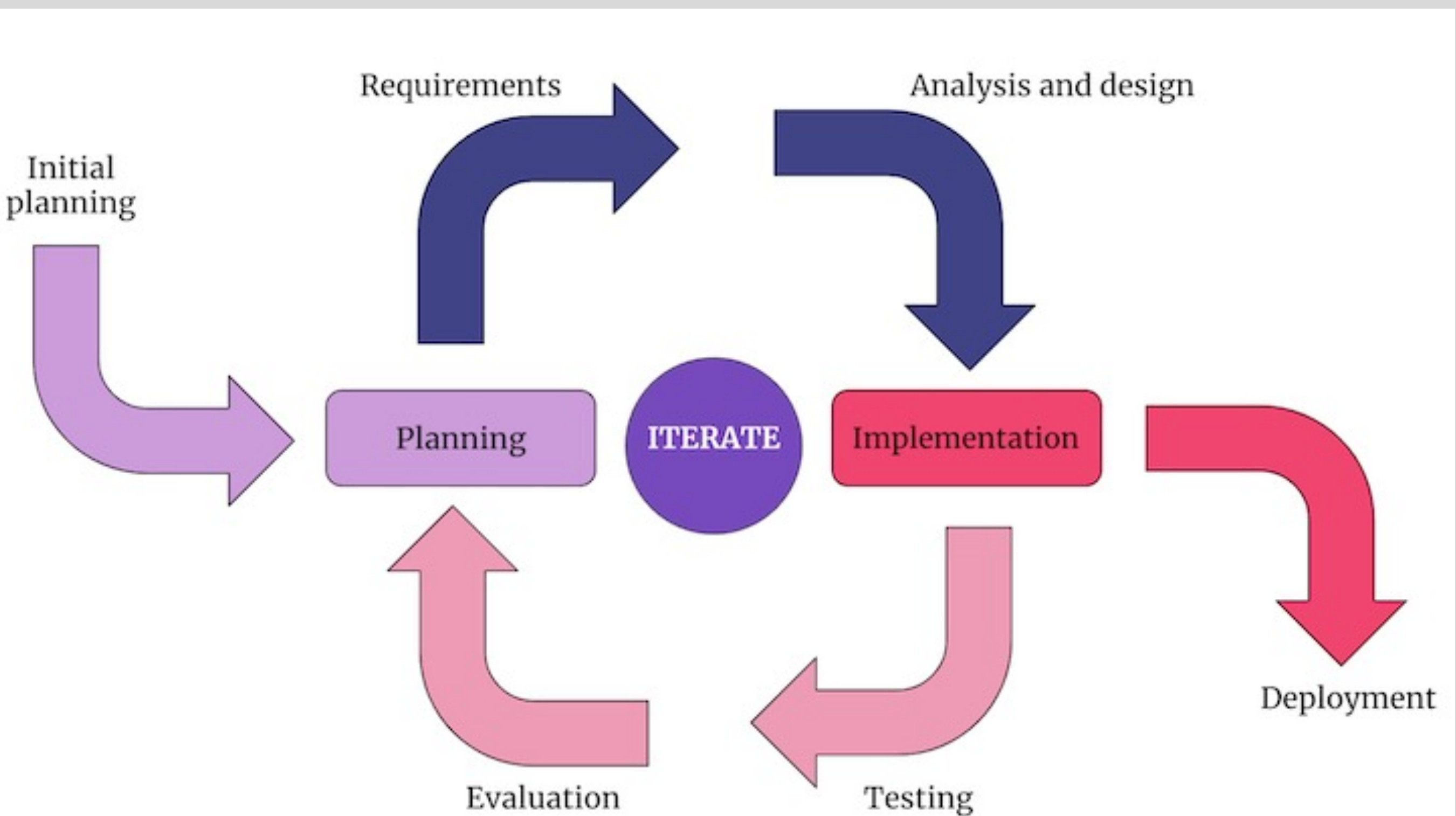
Limitations / Confounds

- Sample size, timeline, number of infectious sites, comorbidities, parameters chosen
- At this stage, conclusions are strictly extrapolations of hospital data available in EMR
- Does not include interviews with patients and healthcare team

Conclusions

- In this patient population with long hospital stays and extensive medical and social complications, finding a generalizable cause of increased LoS is difficult.
- When narrowing to factors within the control of UCH personnel and systems, however, a possible area for improvement became evident.
- Delays in decision making between medical teams, often but not always leading to delays in necessary procedure completions, were the two most common categories theorized to increase LoS in this cohort
- This is supported by subjective chart data as well as the findings that the median number of consult teams per patient was 6, with each patient averaging at least 1 non-bedside procedure

Next Steps



- ❖ Increase sample size to strengthen preliminary theory that procedure delays and discoordination of consulting teams are the primary drivers of extended LoS in this diagnostic subgroup
- ❖ If these theorized drivers are strengthened by sample size, the next step of this project is to pilot a multidisciplinary committee for *Staphylococcal* sepsis patients in order to streamline medical decision making and procedural scheduling for this tenuous population