Quality Analysis of Sepsis Treatment Procedures

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Background
• Sepsis = Infection + Systemic Inflammatory Response Syndrome (SIRS)
  • SIRS = 2 or more of abnormal (heart rate, resp. rate, temp., white blood cell count)
• Sepsis Bundle = sepsis treatment measures within a time interval deemed appropriate by the Department of Health. Compiled if all measures succeed in time.
• BPA Data = Data obtained from Best Practice Advisory devices used to better clinician care. Contains some but not all nor necessarily “correct” treatment measures used in sepsis bundle calculation
• DOH Data = Data containing the “correct” treatment measures used in Sepsis Bundle calculation sent to the Department of Health—not readily available
• Surrogate Bundle = Analogous to Sepsis Bundles, only using readily available BPA Data rather than the necessarily true treatment measures. Can be thought of as an “approximation” of true Sepsis Bundles

Main Goals
• Verify Outside Clinician’s Surrogate Bundle calculations via replication
• Create software infrastructure that supports automating the process of creating quarterly care quality reports
• Quantify similarity/difference between Surrogate Bundle compliance and true Sepsis Bundle compliance

Results
Data-times of each of the four main variables used in bundle calculations compared between DOH and BPA Data for Q1 2019 sepsis encounters present in both datasets (N = 508).

The histograms of the differences (BPA – DOH) as well as pie charts of dataset content are shown to the right.

Bundle Compliance Comparison

• BPA surrogate bundle conclusion = DOH bundle conclusion: 342/508 = 67.3%
• BPA surrogate bundle complied → DOH bundle complies: 53/118 = 44.92%
• BPA surrogate bundle not complied → DOH bundle not complied: 289/390 = 74.10%
• DOH bundle compliance for this “matching” sample: 154/508 = 30.31% (compared to 22.76% for all of DOH data)
• BPA Surrogate bundle compliance for this “matching” sample: 118/508 = 23.23% (compared to 23.50% for all sepsis-having BPA data)

Discussion
• Compliance agreements between true and Surrogate Bundles are based solely on the end result, meaning bundles can both reach the same conclusion via different ways (of failing or succeeding)
• Limited sample (sepsis encounters present in both DOH and BPA datasets) could potentially be biased. Simple comparison of sample compliance compared to population compliance show that the DOH data is heavily biased but the BPA Data does not appear to be biased based on this same method

Conclusion
• On the average, one can predict with approximately 67% accuracy the true Sepsis Bundle compliance (pass or fail) based on the corresponding Surrogate Bundle compliance
• By the end of my internship, a software infrastructure was created to automate the calculation of Sepsis Surrogate Bundles

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