Analysis of Symptom Parameters in Relation to the Identification of Infectious Condition

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Introduction: A college campus presents a unique environment to study transmission of respiratory illness as well as the clinical progression of certain infections. The research team’s overall goal is to characterize a contagious phenotype of someone recently infected with an acute respiratory illness and track the subsequent transmission of disease between college students living in close proximity. With that, this group sought out to determine if there is significance between self-assessed symptom scores and laboratory results from a participant’s clinical samples. This relationship is crucial to define, as symptom scoring is utilized as a determinant of sickness, which dictates a participant’s potential for further testing before laboratory results are processed. Clinical samples were collected from individuals with suspected acute respiratory infections from a cohort of living and learning undergraduates during the Spring 2017 semester. Symptom scoring associated with the instances that the samples were collected at were analyzed, comparing 99 positive samples and 349 negative samples. A statistically significant difference was found between the median symptom score associated with positive and negative clinical samples for surveys on cough, upper respiratory composite and total symptom composite.

Methods:

- Participants visit clinic within 48 hours of symptom onset
- Complete symptom survey, provide nose and throat swab samples, name close contacts for possible transmission
- Samples analyzed for positive viral and bacterial targets using qPCR while symptom scoring evaluated with Mann-Whitney U Test

Discussion:

- Based on the Mann-Whitney U test, all of the differences in distribution between the positive and negative comparisons were found to be statistically significant, aiding in the validation of symptom scoring when comparing to lab standards for positive and negative disease state. As such, the graph data can be used to extrapolate some assumptions. For cough score, the median symptom score for the positive group was 1 and for the negative group it was 0. While there is obviously some range within the groups with the upper quartiles of negative cases reporting cough symptoms, the general expectation based on this data is that positive cases will present with cough while negative cases will present no cough. In instances where quick determinations are to be made, the presence or absence of cough could be seen as an indicator of the presence or absence of infection.
- Both the total symptom score and upper respiratory score were especially compelling since they include a more total picture of clinical presentation. The difference in medians of 5 and 4 respectively for total and upper respiratory allows for a practical separation of the positive and negative cases based on the associated clinical visit.
- While the difference in medians are significant, this group recognizes that this alone does not qualify the survey so additional statistical tests should be applied to evaluate the separation in scores and look for a possible trend in symptom scoring associated with differences in cycle threshold values of the qPCR testing. In relation to the standard composite scores focused on here, the group wants to further explore other possible combinations of symptoms that may be more indicative of a positive result.

References:


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