Is relative viral load an important metric for treatment and prognosis of influenza A?

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Introduction

- Influenza-like illnesses (ILIs) share several common symptoms but are caused by a wide variety of pathogens (e.g. TB, malaria, and influenza). Accurate diagnosis of ILIs can help clinicians choose effective treatments.
- RT-qPCR has high sensitivity and specificity for diagnosing several illnesses, including Influenza A/B. However, this technique used to be expensive and impractical.
- Recent advances in PCR tech, such as Roche's Cobas LIAT system, allow for PCR diagnoses in 15-20 minutes at a standard point-of-care facility.

- PCR can provide qualitative diagnoses and quantitative estimates of viral load.

Are quantitative PCR results useful to clinicians?

Methods

- Three part study: mandatory pre-visit survey, clinic visit & lab results, optional post-visit survey.
- Data was joined, cleaned, and filtered in `R`.
- Collected **PCR Cycle Threshold** and converted to relative viral load (x is a threshold value provided by Roche).

$$\text{Log10 Relative viral load} = \log_{10}\left(2^{x-Ct}\right)$$

- Symptom scores were created by *a priori* dividing symptoms between the categories and removing any symptoms that were more than 90% correlated.
- Overall, we had $n = 136$ patients in the study, all of whom were positive for Influenza A.

Results

Relative viral load at diagnosis has no clear relationships with patient reported symptoms.

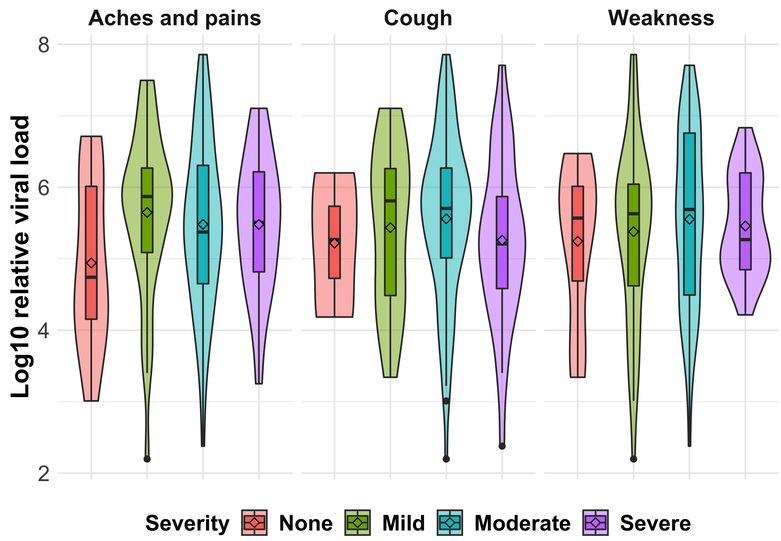

Figure 1: There appears to be no real trend between the relative viral load at diagnosis and the reported symptom intensities.

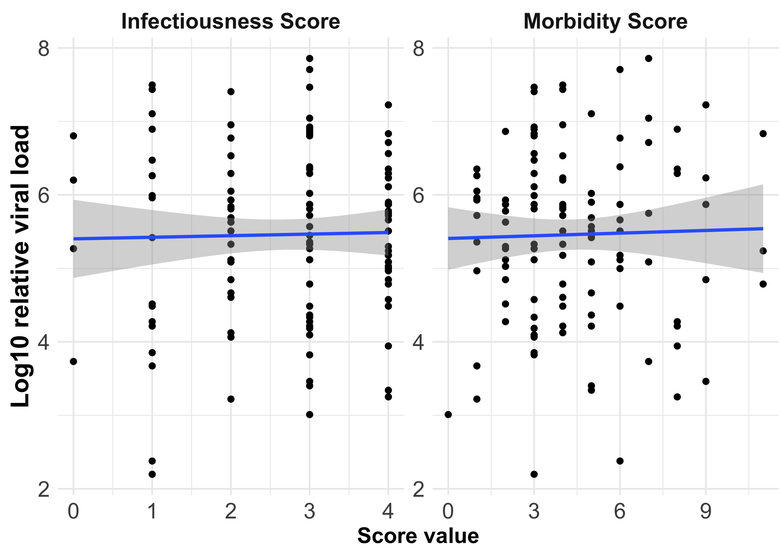

Figure 2: There was no apparent trend between symptom scores using patient data and relative viral load at diagnosis. Unfortunately clinician reporting of symptoms was too sparse and heterogeneous to meaningfully analyze those scores.

Some clinical results appear to be associated with relative viral load at diagnosis.

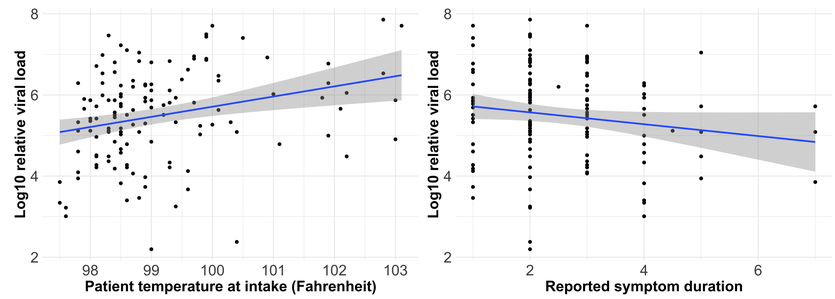

Figure 3: There is a strong positive relationship between relative viral load at diagnosis and patient temperature at intake (L), and a negative relationship between RVL and reported duration of symptoms (R).

No trends were observed between relative viral load at diagnosis and follow-up data.

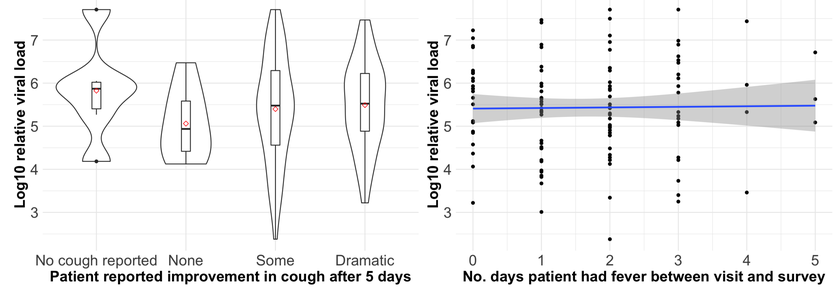

Figure 4: There was no strong association between patient reported recovery and relative viral load.

Conclusion

While relative viral load was not associated with any patient-reported variables in our study, the relative viral load was correlated to some clinical outcomes. Further investigations on clinical data should be conducted.

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