

Review of: "Measuring the efficacy of a vaccine during an epidemic"

Lilia Leticia Ramírez Ramírez¹

¹ Centro de Investigación en Matemáticas (CIMAT)

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The article "Measuring the efficacy of a vaccine during an epidemic" by Antonio Scala and Pierpaolo Cavallo, brings up the topic of vaccine effectiveness, considering the variable number of contacts with infectious individuals that occur during the evolution of an epidemic outbreak. Although the topic is very interesting and relevant, the article still has some writing inaccuracies that need to be addressed to better present this work objectives and scope.

The article clearly comments on the differences between the efficacy and effectiveness of vaccines but fails to clearly convey whether the emphasis is on modeling and studying one or the other. While the term "efficiency" is used in the title, the paragraph from lines 61 to 67 mentions that effectiveness is being studied. This last affirmation seems to be correct as the authors considering one external factor that can influence the transmission: The number of infected individuals that the cohorts come into contact.

Although effectiveness considers some other factors such as age and socio-demographics, the article considers that these do not have a significant effect since the groups are representative of them. The emphasis is therefore on studying the effect of the susceptible-vaccinated-placebo-infected composition on effectiveness.

Equation (1): Correct the ";".

Line 86: Replace "efficacy" with "efficiency".

The problem with calculating efficacy in phase III studies is the lack of knowledge and control over some variables, which can lead to significant violations of the assumptions on which the model is built.

While some assumptions can be more easily met, such as those described in lines 96-102, in practice it will be important to justify the assumption of representativeness of the groups, as there are diverse situations that impact them significantly. For instance, in many cities-countries, for COVID 19 vaccines were prioritized for certain age or comorbidity groups that make them more vulnerable, vaccines were not administered at the same time or from a single laboratory, and in some cases, less strict isolation measures were applied to people working in certain productive or service sectors.

While the affirmation in 115 "Lower values of c correspond to initial phases" is clear, stating the same for final phases of the epidemic is no true as the attack rates have been defined as cumulative over time. Because of this same definition then the highest values of c should occur closer to the final phase of the epidemic and not near the peak. What it is clear is that near, and prior, the peak, c experiences an accelerated increase.

Fig 1. It is not clearly explained if you are considering the attack rate for vaccinated individuals or all susceptible individuals. In either case, the definition on eta is lacking the attack rate for individuals with placebo. Maybe these questions and others are the results of presenting the Section Results before the Section Methods.